IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

IN RE: REMBRANDT TECHNOLOGIES, LP PATENT LITIGATION	MDL Docket No. 07-md-1848 (GMS)
MOTOROLA, INC., et al., Plaintiffs, v. REMBRANDT TECHNOLOGIES, LP, Defendant.	C.A. No. 07-752 (GMS)
REMBRANDT TECHNOLOGIES, LP, et al., Counter-Plaintiffs, v. MOTOROLA, INC., et al., Counter-Defendants.	
REMBRANDT TECHNOLOGIES, LP, et al., Counter Counterclaim-Plaintiffs, v. TIME WARNER ENTERTAINMENT-ADVANCE/NEWHOUSE PARTNERSHIP, et al., Counter Counterclaim-Defendants.	

CABLE PARTIES' OPENING CLAIM CONSTRUCTION BRIEF CONCERNING U.S. PATENT NOS. 5,852,631; 5,710,761; 4,937,819; 5,719,858; 6,950,444; 5,008,903; 6,131,159; AND 5,778,234

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TABLE OF ABBREVIATIONS AND CITATION FORMATS

Cable Parties	Equipment Vendor Plaintiffs/Counter-Claimants & Cable Sytems Operators Defendants/Counter-Claimants adverse to Rembrandt/Remstream in pleadings on the Eight Patents (individual Cable Parties join only the 8 patent subset asserted against them)
'631	U.S. Patent No. 5,852,631
'761	U.S. Patent No. 5,710,761
'819	U.S. Patent No. 4,937,819
'858	U.S. Patent No. 5,719,858
'444	U.S. Patent No. 6,950,444
'903	U.S. Patent No. 5,008,903
'159	U.S. Patent No. 6,131,159
'234	U.S. Patent No. 5,778,234
CLCI	Communication Link Control Information
CPM	Central Packet Manager
DOCSIS	Data Over Cable Service Interface Specification
ECNS	Error Control Negotiation Sequence
EP Set	Essential Programs Set
ITU	International Telecommunications Union
MAPC	Multiple Access Packet Channel
NAU	Network Access Unit
NAM	Network Access Module
PSTN	Public Switched Telephone Network

CITATION FORMATS

(column numbers : line numbers.)	Patent specification column and line reference
[1__]	Citations to the Cable Parties' claim term Groupings in **Exhibit 1 to this Brief.**
(A__)	Citations to a case in the numbered listed in the Table of Authorities
(C__)	Citations to the Cable Parties' exhibits in the Joint Appendix (consecutively paginated)
(F__)	Citations to the File History in the Joint Appendix (consecutively paginated)
(V__)	Citations to the V. Protocols in the Joint Appendix (consecutively paginated)

This brief concerns eight patents that Rembrandt, a fund which raises money to file patent suits, obtained through AT&T Paradyne, a dial-up and, later, DSL modem company focused on sending data over telephone lines. Paradyne did not invent or contribute to the accused "DOCSIS" cable industry specification released *nine* years before Rembrandt's first suit. For each patent, our brief below provides an overview of the invention, followed by claim constructions rooted in intrinsic records. Because Rembrandt insists on asserting ***eighty-nine*** claims, many terms need construction. To navigate these claims, Exhibit 1 groups related terms, and the heading for each patent subsection below cites to the relevant groups in these charts. Cable Parties' constructions focus on the overall context of the claims and their intrinsic records. By contrast, Rembrandt excises snippets of a claim term, eliminating all context, and distorting the claims. This error compounds by Rembrandt's departure from the intrinsic records.[1]

I. '631 PATENT OVERVIEW

The '631 eliminates steps usually required to establish a connection between a "calling modem" that places a call over a telephone network to an "answering modem." A connection between two computers requires 5 or 7 different "layers" of communication, each performing different functions. (1:23-45.) The '631 deals with the first two layers: the "physical layer" and the "link layer." (1:46-48.) "The physical layer . . . is concerned with establishing the electrical and mechanical link between two modems," and is established on completion of training and start-up in the '631. (1:49-51; 6:54-56.) The link layer "perform[s] error checking functions as well as retransmitting frames that are not received correctly." (1:51-54.) ITU standards existed

1 The Court's Order required the parties first to propose terms to construe and, later, to exchange constructions. For virtually ***all*** of our terms, however, at the simultaneous exchange Rembrandt unfairly did not provide constructions. Instead, it first reviewed ours for weeks, responding later. (C1) Rembrandt's belated constructions should be precluded.

for establishing and operating these different layers. (1:55-60.) "V.21, V.22, V.32, V.32bis, V.34" are ITU physical layer standards referred to as "modulations" in the '631. (6:12-17.) V.42 and V.42 bis are link layer standards. (2:39-42; 11:30-33.) These are telephone network standards, and each is concerned only with the physical or the link layer. (1:60-61.)

Figure 2 depicts "the three principal components of modem exchange" for establishing physical and link layer connections. (6:26-28.) After a calling modem makes a phone call, "the modems enter a mode select sequence, referred to herein as automatic mode synchronization **40**" ("automode"). (6:30-31.) "This sequence **40** . . . synchronizes the modems for communication in accordance with the same standard or protocol, such as V.34, V.22, V.22bis, etc." (6:30-36.) After selecting a modulation standard, the modems use it to "enter a training and startup sequence" (6:37-39) in which they establish physical layer connection parameters. "The completion of this sequence signifies the establishment of a physical layer connection between two modems." (6:54-56.) Next, "the communicating modems enter the . . . error-correction negotiation **44**, in order to establish the link layer connection", which normally includes negotiating link layer connection parameters. (6:57-60, 63-65.)

The '631 reduces time to establish a physical layer connection from 10-15 seconds to 1, and a link layer connection from 1-3 seconds to near nothing. (2:19-58; 12:43-45; 13:34-37.) If the modems can agree in automode on a "fast connect" physical layer modulation (e.g. ETC2-QC)(2:29-38), they can default to physical layer parameters preset in the modems to eliminate training/startup steps. (Figs. 4-7; 7:23-30; 10:63-66; 11:6-10.) And, contrary to "conventional wisdom [that] the link layer connection be independent of the physical layer connection" (11:35-37), the "invention establishes the link layer connection based upon the modulation chosen in the physical layer connection." (11:39-41.) "This link layer connection includes parameters that are

preset to default values *based upon* the negotiated physical layer connection. Thus, the modems [can] avoid the link layer negotiation." (3:10-15; 11:46-51; 12:61-65.)

1. "Calling Modem" Places A Telephone Network Call To An "Answering Modem" (1A-B)

The '631 establishes connections between a "calling modem" and "answering modem." Like a person making a telephone call, the '631 calling modem dials a telephone number to place a call over a telephone network, either the PSTN (which is the landline telephone network) or a cellular network. (6:28-36; 66-7:20; 7:31-42; 8:24-9:8; 9:15-57; 10:1-12.) It "dial[s]" the "answering modem," transmits "calling signals" to it over the telephone network and then exchanges tones in the frequency range of telephone networks (<3000 Hz) to select a physical layer modulation. (*Id.*) The '631 thus refers to a "cellular call"; "phone company"; "1-800 number"; "busy signal"; and "calling signals." (2:27; 5:37, 39; Fig. 4; 7:16). Indeed, the terms "calling modem" and "answering modem" come from intrinsic V. telephone network standards (V1-285), and the intrinsic '631 provisionals and cited prior art confirm that the calling modem places a call to an answering modem over the PSTN or cellular telephone network. (F1-122; 1629-30, 1631 at 1:8)(A11.) Dictionaries confirm this meaning of "calling." (C2-5.)

In addition, while the '631 is directed to shortcuts that modems can take to establish physical and link layer connections when using a fast connect protocol, both modems must "fallback" to one of "several" conventional ITU V. standards, if either modem does not support fast connect. (6:12-17; 13:17-22.) Thus, the '631 "calling" and "answering modems" must operate as those in the V. standards, and may use faster telephone protocols. (F1-122)(V1-285).

2. First Choosing And Then Using The "Physical Layer Modulation" In Sequence (1C-F)

Negotiation of the physical layer modulation, establishment of the physical layer connection and establishment of the link layer connection must occur in that sequence in the

'631. The specification is clear about this (3:4-9; 6:37-39, 54-61; 11:22-26, 33-36), and the claims themselves require establishing physical and link layer connections "based upon" the physical layer modulation, meaning negotiation of the physical layer modulation occurs first.

Helpful to understanding this sequence are constructions of its components. First is the "physical layer modulation," which the patent teaches is a telephone network (PSTN or cellular) standard that governs only the establishment of the physical layer connection between a "calling" and "answering modem." The '631 specification refers to its "physical layer modulations" as preferably the "Enhanced Throughput Cellular 1™ (ETC1™), V.34, V.32bis, V.32, and V.22bis *modulations*." (6:14-17). Each such "modulation" governs only the physical layer of the connection between modems operating over the telephone network, PSTN or cellular. (V1-176; F1-122.) The patent notes that there are physical layer and link layer standards for these modems, and explains how "each one . . . is directed to an aspect of *either* the physical *or* data link layer of the OSI model" - none are to both. (1:60-61.) The '631 identifies physical layer (6:14-17; 6:34-36) or link layer standards. (11:31-33.)

After negotiating the "physical layer modulation" comes establishment of the "physical layer connection" using that "physical layer modulation." The patent instructs that its "physical layer connection" is "the connection formed between the calling modem and answering modem upon completion of training and start-up, before any link layer connection is established." This is right from the patent: "At the completion of the training and start-up sequence **42**, the modems have established a physical layer connection . . . ." (11:22-24; 6:53-56.)

Last, in the '631, comes establishing the link layer "*[a]fter* the physical layer has been established." (6:57-61.) The '631 unambiguously confirms its link layer connection "is established *after* establishing the physical layer connection" with "telephone network link layer

standards" using settings "based upon" the "physical layer modulation" as explained below. (*Id.*; 1:57-58; 2:40-54;11:29-32.) File history is in accord. (F190; 206-9.) Construction of these terms and their sequence must follow intrinsic evidence. (A1-5.)

3. Physical And Link Layer Connections Established Without "Data Bytes" (1E-F)

The '631 modems exchange "frequency tones," rather than "data bytes," to negotiate which physical layer modulation to use and allow the modems to default to preset parameters. "Through the exchange of *tones*, the modems are made aware of the possible shortcuts in the fast startup and training sequence **42**, and more particularly, in the error-correction negotiation **44**." (7:27-30, 43-51, 58-64; 8:35-51; 12:66-13:2; 6:6-11.) The applicant relied on "frequency tones," as distinct from "data bytes," to overcome prior art rejections. In distinguishing prior art to "McGlynn," the applicant argued that "McGlynn specifically teaches away from the present invention" because, among other things, McGlynn's use of "data bytes" "*is contrary to the present invention which uses different communication techniques (e.g., different frequency tones) to establish the physical and link layer connections . . . .*" (F208-9.) The applicant argued that with these modems, "data bytes" cannot be sent "prior to the establishment of the physical and link layer connections." (*Id.*) Rembrandt now is bound by the patentee's concessions. (A6.)

4. "Based Upon" - Calling And Answering Modems Default To Preset Values (1G-H)

All claims require the physical layer connection and link layer connection be "based upon" a negotiated physical layer modulation. This concerns the '631's objective to eliminate connection steps normally required to establish physical and link layer parameters, by instead defaulting to parameters preset in each modem before the call is placed. (8:12-23; 11:2-22; 12:55-13:22.) At the physical layer, "modems can default to preset values that eliminate the need for probing, ranging and half-duplex training." (11:5-8.) At the link layer, the '631

describes setting "the error-correction parameters to preset values . . . so as to avoid the necessity of negotiating the parameters." (7:43-51; 12:55-65; 12:66-13:7.) Rather than communicating parameters, "certain assumptions can be made regarding the error-correction negotiation sequence," allowing parameters to default to preset values without needing to communicate them. (13:1-3.) "This…reduces the time" for making the connection and "removes the necessity of performing additional handshaking that, if corrupted," can result in call failure. (11:45-51.)

Claims 6 and 10 (1G-H) incorporate these exact limitations as construed above, as functions in Section 112, ¶ 6 language. "Logic for" lacks structure and is subject to 112, ¶ 6. (A15-16). Structures necessary for their functions include PSTN or cellular modems with a control processor programmed to implement Fig. 4-7 algorithms for frequency tone exchanges.

II. '761 PATENT OVERVIEW

The '631 is terminally disclaimed over the '761 patent, and both list the same sole inventor. The '761 patent relates to the "error control negotiation phase of establishing a data connection" (1:7-8) between two telephone modems, described above with respect to the '631 patent (and depicted as phase 44 in Figure 2 of that patent.) The process by which a calling and answering modem determine which link layer telephone network standard they will use begins with the calling modem trying, for some defined length of time, to establish a link layer connection with the answering modem using one of the link layer telephone network standards. (1:21-35.) If the answering modem does not "appropriately respond," the calling modem tries again, using another such link layer standard, for some defined length of time. Such a sequence of link layer standards that a calling modem will try to use in turn (in trial-and-error fashion) to establish a link layer connection is called an "error control negotiation sequence" ("ECNS") (1:38, 59-61; 2:5-6, 27-34; 3:56-57, 66-67.) Different ECNSs are "stored" in a modem's

memory. (3:58-4:4; Fig. 1.) In the prior art, a user of the calling modem would manually set it to execute a desired ECNS using an "AT command." (2:5-10, 48-50.) If that ECNS failed to establish a connection, the user manually sets the modem to try a different ECNS. (*Id.*)

"Error control protocols" (link layer telephone standards) available when the '761 was filed were "'Link Access Protocol Modem' (LAPM), 'Microcom Networking Protocol' (MNP), [&] 'Buffer' (which in reality is no error control)." (1:17-21.) This sequence of error control standards was one of the ECNSs preprogrammed into modems that could be used by issuing the right AT command. "In this negotiation sequence, the modem attempts to connect with the far end modem for several seconds, e.g. 2 seconds" using "LAPM." (1:20-26.) If it fails, "the modem then tries to connect" "for several seconds, e.g. 6 seconds" using the "MNP Protocol." (1:28-31.) If that fails, "the modem then falls back to a non-error control mode." (1:32-33.)

The problem with this ECNS is that if a modem negotiated a physical layer modulation standard such as V.34 that uses a "high[] modulation speed[]", "the error rate ... is high." (1:36-47.) "This effects the time it takes to perform the subsequent error control negotiation," so that "the LAPM type of error control may not be negotiated within the 2 seconds" even though the modems support it. (1:47-54.) The user could switch the modem to "a different" ECNS like "'LAPM or Disconnect'" where "the modem tries for an extended length of time, e.g., 30 seconds, to negotiate a LAPM data connection." (1:59-63.) However, using this ECNS still "presents a problem when connecting to modems that do not support LAPM, i.e. MNP-only or non-error-control modems," because, after the failed try at LAPM, a user must manually issue an AT command to switch the modem to the "LAPM, MNP or Buffer" ECNS setting. (1:66-2:10.)

The inventor's solution to these problems was based entirely on an "observation," applicable only to telephone modems and telephone network physical and link layer standards in

existence at the time, that there is a correlation between the telephone network standard a modem will negotiate for the physical layer and the link layer standards the modem likely supports: "I have observed that almost every high-speed modem (V.34, V.32bis. V.32) has a LAPM mode, and that the LAPM mode is enabled" whereas "only the low speed modems (V.22bis or below) are MNP-only or non-error control." (2:13-20.) Applying this observation allows a modem to "dynamically select[] the type of link layer negotiation sequence as a function of the physical layer." (2:20-23.) For example, "[w]hen the modem negotiates a V.32 or higher modulation, the modem uses the LAPM or Disconnect' error control negotiation sequence. However, when the modem negotiates a V.22bis or lower modulation, the modem uses the 'LAPM, MNP or Buffer' error control sequence." (2:29-34.)[2] Thus, by determining if "the value of a negotiated [physical layer] parameter" is greater or less than a "predefined value" differentiating between low and high speed V. modulations, the modem would choose which ECNS to use. (3:51-4:1; Fig. 2.)

1. An ECNS Is A Sequence Of Error Control Protocols Tried In Turn (1A)

All asserted claims require selection of an "error control negotiation sequence," which is "a sequence of different types of error control protocols or a disconnection step that the equipment attempts to use in turn, such that when an attempt to use one such protocol fails, the next option in the sequence is tried." This comes right from the patent, which explains that "a modem tries each type of error control protocol in turn." (1:20-26;1:38.) The '761 defines this trial-and-error sequence as an ECNS (1:17-35) which can include "a disconnection step" because the patent includes "disconnect" in the "LAPM or Disconnect" ECNS. (3:58-64)(A7, 8.)

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[2] The '761 also refers to ECNS selection based on the negotiated data rate because the inventor observed that data rates correlated to V. physical layer modulation standards. (2:15, 43-46.)

2. Selection Of An Error Control Negotiation Sequence Occurs After The Physical Layer Standard Is Selected And Used To Determine The Physical Layer Parameters (1B, E)

"Selecting one of a number of error control negotiation sequences as a function of a value of at least one parameter from the set of parameters for the physical layer" means "after negotiating the physical layer and determining the physical layer parameters, using the value of at least one determined physical layer parameter to select one of multiple link layer error control negotiation sequences." The specification revolves around an observation that the physical layer is *always* negotiated "before" the link layer, and that the correct ECNS can be picked by examining the *previously* negotiated physical layer modulation. (2:13-20.) Thus, the claim language requires "selecting" the ECNS after "negotiating" the physical layer standard. "Selecting" in the claims is "a function of a value of at least one parameter from the set of parameters for the physical layer," referring back to "the set of parameters" determined by the "negotiating" step. The specification requires this order, stating that the "CPU **110** *first* negotiates . . . the physical layer" and "[a]fter" that step selects an ECNS using the value of a *determined* physical layer parameter. (3:43-45; 3:51-4:1; Fig. 2's first step, 305)(A3-5.)

3. "Physical Layer" & "Error Control" Refer To May 1995 Telephone Standards (1C-D)

The '761 only discloses an improved method for selecting a then-existing (May 1995 filing date of the '761) ITU link layer telephone network standard as a function of first negotiating a then-existing ITU V. physical layer standard. As discussed in the '761 overview above, the invention is predicated on empirical observations regarding correlations between different types of V. modems in the field and types of link layer error control protocols they likely support. These observations only apply to V. telephone network standards (2:13-18), so the claims cannot be interpreted more broadly. (Abstract; 2:29-34.) In fact, the patent taught

that its modems could use only three existing error control protocols: LAPM, MNP or Buffer. (1:66-2:1.) If a modem was not LAPM, the '761 taught that the modem must be either MNP or Buffer (no error control), allowing for no other possibility. (1:66-2:1.) The '761 cannot support a claim scope broader than the boundaries staked out in its own description. (A1-2.)

The Examiner of the '761 understood that the invention had no applicability beyond the cited protocols and standards existing at that time, and therefore objected to the specification because "it fails to provide a date for the associated protocols and standards. A date is important since protocols and standards may change over time." (F282.) The patentee overcame this objection by confirming that: "the applicable date of the *cited* protocols and standards is the filing date of the present invention. However, Applicant asserts that one skilled in the art would understand that the present invention is applicable to all versions of the *cited* protocols and standards." (F307.) The PTO thus prevented the patentee from obtaining claims broader than as "applicable" to the "cited protocols," in existence as of the "filing date." The claims may not now literally cover protocols that did not then exist, to which the inventor's "observation" is inapplicable, and that were not referenced by or even permitted in the '761. (A10, 1-2, 6).

III. '819 PATENT OVERVIEW

The '819 purports to overcome deficiencies in prior art computer networks that allowed a master unit to communicate over telephone lines with "multiple modems" called remote units. (1:14-18, 7-12.) A master unit is connected to a host computer that runs "host applications" to remote units connected to data terminal equipment (DTE). (*Id.*; 6:11-13, 52-54.) These networks are "multidrop networks," meaning a master unit sends "polls" from a host application to one remote at a time asking for response data. (C19)(F1600, 1603.) Some prior art multidrop networks could run multiple host applications on one line, while others had to use a different line

for each application. (1:14-20.) Running multiple host applications on one line required a way to manage traffic so remotes responding to polls from different applications did not interfere with each other. One prior art solution "is to use a single line with frequency division multiplexing" using "one [frequency] for each application," but this caused problems. (1:21-41.) The '819 supposedly avoids these frequency division multiplexing problems by instead having each remote "respond in a unique time period assigned to each host application." (2:6-7.)

The '819 technique requires "the user" who first sets up the system to "defin[e]" a time "period or frame" that is "divided . . . into a number of subframes," one subframe for each remote. The subframes are "further subdivided into slots, one for each application." (4:54-57; Figs. 5; 6.) Every application thus has "a pre-assigned time period (or slot) within a subframe to transmit from" the particular remote to which the subframe is assigned. Since each subframe is assigned to a different remote, and each slot in the subframe is assigned to a different application, "contention" or interference between communications from different remotes and applications is avoided. (4:57-59; 2:8-15.) Users input "framing periods, slot and subframe assignments" during "initialization" that takes place as "part of the installation" of the system before "normal operation." (2:68-3:6; 5:8-9; 5:57-58; Figs. 6-7.) "Normal operation" then proceeds using the assignments made during initialization. (Figs 8-9.) If application poll response data of a remote exceeds what it can send in its single assigned time slot, it can activate reservation request bits seeking temporary use of slots assigned at initialization to subsequent remote units. (3:7-9; 2:18-26; 6:57-60.) No slot gets reassigned during normal operation.

"[T]o accurately synchronize the transmission," the '819 technique also requires -- before "normal operation" -- "ranging or measuring the round-trip transmission or delay time between the master unit and each remote." (2:10-17.) During the "initialization phase" (5:24-25), "a

ranging calculation for each combination of remote unit . . . and application" is made. (5:25-27, 57-58.) Then, in "normal operation," each remote sends and receives messages in the assigned time slots for each application, and uses its input and output ports to communicate data for each application to and from an attached computer (DTE). (Figs. 2, 4, 9)(6:11-13, 52-54.)

1. Master Unit Sends Messages Using TDM Without Packet Headers Or Delimiters (1A)

A **master unit** is "a device installed in a network that sends messages to its remote units using time division multiplexing without packet headers or delimiters." "The basic features [of the invention] are time division multiplexed outbound transmissions from the master to the remote units . . . ." (1:63-65.) Packet headers or delimiters, sometimes used in other systems to identify a message's origin or destination and to separate messages, are not used by the '819 because the master and remote already know in advance which slots have been assigned to which remotes and applications. (2:68-3:3.)[3] The applicant relied on this exact point to overcome an Examiner's rejection by arguing that "the outbound messages" from the prior art's "master unit are 'packetized' whereas the instant claimed invention is time division multiplexed without packet headers and delimiters." (F1461)(A6.) **Remote unit**, shown in Figures 2 and 4 as a modem (modulator **52**/demodulator **38**), is construed accordingly. (1:14-15; 2:32-35.)

2. Remote Units "Communicating With Said Master Unit In A Multidrop Configuration" Means Remote Units Transmit Only In Response To Master Unit Polls (1B)

Communicating with said master unit in a multidrop configuration is "a configuration where all inbound transmissions to the master unit contain responses to outbound polls to remote units." "Multidrop configuration" is used in the '819 patent and the art to refer to

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3 The '819 refers to optional "address bits" as "an identifier to the master." (4:68-5:1.) It does not describe the use of identifiers in messages from the master to the remotes.

such polling. (1:7-12; 2:26-28; 6:52-60)(C19)(F1600.) In describing its *overall invention* (as opposed to a preferred embodiment), the '819 instructs that "***[a]ll*** inbound transmissions contain . . . poll response data" (6:57-60) because this invention relates only to multidrop networks that require polling of each remote for it to communicate: "This invention relates to . . . a master unit in a multidrop network [communicating] to and from a plurality of remote units. . . using half-duplex polled protocols." (1:7-12.) The '819's alleged contribution is that it "permits multiple multidrop networks . . each serving a distinct half-duplex host polled application, to be replaced by a single multidrop network serving each of said host applications." (2:28; 1:63-2:7.) Intrinsic record file history art confirms this construction. (F1600, 1603, 1604:24-8)(A11.)

3. User-Defined Period (Frame), Subframe And Time Slot Assignments (1E-H)

The '819 instructs that "the time division multiple access sequence is established by the user." (4:53-54.) The user defines the recurring period (frame), division of the frame into subframes, each of which he assigns to a different remote, and assigns each application one time slot per subframe, thus establishing at "initialization" the "sequence" that will repeat in "normal operation." (3:1-5; 4:53-61; 5:15-23; Figs. 5-7.) Constructions below follow these principles.

A period which is divided . . .[1F] refers to a "period or frame" that "is divided . . . into a number of subframes," each of which is "subdivided into slots, one for each application." (4:53-60.)[4] This organization and assignment of time by frames, subframes and slots "is established by the user," "input" into the master and sent to the remote during their "initialization." (*Id.*; 2:68-3:3; 5:15-17; Figs. 6-7.) As Figures 8 and 9 show, once this sequence is set-up at initialization in Figures 6 and 7, these parameters do not change in "normal

4 "A subframe is divided into N time slots." N is the number of applications (4:62-63; Fig. 5.)

operation." Subframe and time slot assignments thus repeat from frame to frame. While reservation requests can be made by one remote unit to temporarily use time slots of subsequent remote units, as shown below, this does not change frame, subframe and time slot assignments.

A **subframe** [1H] is formed by dividing up a frame (4:55-56), and therefore it must begin and end within the same frame, just like the hours of a day begin and end in the same day. The subframe is a "user-input initialization parameter[]," meaning it is assigned by a user. (3:1-2.) The user assigns each subframe to a remote unit. Application claim 13 states "a plurality of subframes, each corresponding to transmission time for one of said remote units." (F1406.) Issued claim 14 requires "dividing each subframe into a number of slots, each corresponding to transmission times for one of said remotes." Like application claim 13, the "each" in claim 14 refers to "each subframe." Moreover, the predicate for claim 14(e)'s reference to "said assigned subframe" is assignment of "each subframe . . . to transmission times for one of said remote units." Accordingly, during initialization, each subframe is assigned to one remote, and each time slot of the subframe is assigned to one particular application for that remote.

"**[I]n a time slot assigned to each of said application programs**" [1E] and similar terms relates to the '819's teaching that "each application" program is "preassigned" to "one" slot per subframe. (4:55-59; 6:49-51; Fig. 5.) This construction of "assigned," "each" and "a time slot" comes right from the '819, while Rembrandt's construction that a "time slot" is simply a time interval that "may" be used by "an application"-- implying any application may use any such slot -- ignores the "assigned" and "each" limitations of the claim language. Rembrandt's proposal also fails entirely to account for the patent's disclosure that: "The subframe is further divided into slots, one for each application." (4:56-5; 6:66-67; Fig. 5.)

The full term **application program** [1D] is not itself used in the specification, as the '819 refers to "host applications" run to remote units that attach to DTE. The plain meaning of application program, as distinguished from Rembrandt's proposal of just any computer program, requires that the application directly meet the needs of a user. (C11,15.) Indeed, the cited multidrop prior art provides examples like a cash ATM operated by a user. (F1604, 1:45-46.)

Master network timing means [1G] "with a" framing "period," subframes, slots and their respective assignments, as the '819 specification provides, is "network timing and control processor **12** [that] stores user-input initialization parameters including network clock framing periods, slot and subframe assignments." (2:68-3:3.) Whether treated as a coined term or it is construed under §112, ¶6, it has this same meaning. There is no basis for Rembrandt's "such as."

4. Ranging Must Be Performed For Each Application At Initialization (1 I)

Ranging means communicating with . . . [1 I], under §112, ¶6, which presumptively applies, is ranging and network initialization generator **20**, ranging receiver **32** which "receives data" from remotes "during an initial training period," and network timing and control processor **12** which stores the "delay period" measured by ranging "in a library table." (5:26-30; 3:42-45.) These components perform "a ranging calculation for each combination of remote unit . . . and application" during the "initialization phase" prior to "normal operation," store the results and send them to remotes. (5:24-27, 57-58.) ("transmitting ... the transmission time ..." in 14(d) is construed the same for similar reasons.) Rembrandt argues that "ranging means . . . " is not a means claim because it says there is no function, but "communicating with. . ." and "wherein a transmission time . . . is calculated and transmitted" in fact refer to functions.

5. Reservation Request Bit In Each Time Slot & Priority Bit (1J-N)

The '819 instructs that each time slot "is sized for the dominant poll response message

length for the application." (6:66-67.) This makes it likely that a remote's poll response for each host application will usually fit in its one assigned time slot. However, the patent provides for longer poll responses by allowing a remote to request "to use the time division multiple access slots of subsequent units." (2:18-26.) The '819 **reservation request generator . . .** "monitors" a compression buffer in the remote which holds data to be transmitted to the master. If the buffer "exceed[s] a preset parameter limit . . . . then reservation request generator **54** automatically sets the reservation bits in the outgoing message." (4:8-14.) Because "[e]ach slot contains . . . reservation request bits" (4:64-65) whereby "[a]ll inbound transmissions contain . . . reservation request bits" (6:57-59), the limitation "**activates a reservation request bit"** [1J] refers to activating the existing bit in the message to identify a required number of additional slots. Thus, "[e]ach" time slot in which a remote may transmit "contains" a **reservation request bit** [1K] to request temporary use of slots already assigned to "subsequent units." If the master grants a reservation request, it "responds to the remote with an 'authorization to transmit' command and transmits a 'transmit inhibit' command to all of the other remote units." (7:7-9.)[5] Thus, one remote is permitted to borrow slots temporarily that were assigned at initialization to "subsequent units," "until the message transmission has been completed." (2:26; 7:10-14.) Rembrandt mistakenly asserts that the reservation request generator "adds" a request to a message, when it actually "activates" an existing bit. Also, this request is for temporary use of slots permanently assigned to other remotes at initialization, implemented by "authorization to transmit" and "transmit inhibit" commands that temporarily suspend the existing assignments.

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5 "Reservation request processor" [1L] is the master unit counterpart to the "reservation request generator." (3:7-9; 2:18-26).

Priority bit [1N] is a bit "defin[ing] the remote's relative importance" as "compare[d]" to "subsequent units," input by the user at master initialization. (7:2-3; 2:21-23; 3:1-4.) No support exists for Rembrandt's construction of priority of the "message."

IV. '858 PATENT OVERVIEW

The '858 improves upon prior art "network access units (NAUs) that interface local networks (*e.g.* networks at a single site, such as internal telephone and data networks) to a network facility that transmits "to an opposite endpoint" from the local networks. (1:13-16; Figs. 1-3; 3:20-22; 1:33; 2:57-61; 4:15.) The '858's NAU can "support two types of data: synchronous data and packet data." (1:18-23.) Local network "telephone equipment" provides synchronous data (formatted for the telephone network), and local network "data terminals" provide packet data (formatted for packet switched networks), to be sent through a network facility, which has a "fixed" amount of bandwidth "allocated for packet data." (*Id.*; 2:1, 45; 6:33-35; 1:67-2:1.)

Each NAU contains "packet application modules" and "synchronous application modules." (2:49-53.) Each such module (alternatively called a "source") is a "circuit board" coupled to either telephone or data equipment external to the NAU (1:35-40; 4:9) and "plugged into" a "slot" within the NAU that connects it to the NAU's internal TDM bus. (7:47-53.) Unlike the '858 invention, prior-art packet modules require a "central packet manager" ("CPM") component which "is a common resource" for all the packet modules. (1:38-48; 2:19-23; 2:46-48; Figs. 1-2.) The prior art CPM assigns TDM bus time slots to packet modules and "aggregates" packet data from separate packet modules "to create a single multiplexed packet stream." (1:51-64; 2:21-27.) This stream is sized to fit the bandwidth of the network facility for

packet data, and passes from the CPM through a network access module (NAM) inside the NAU onto the network facility. (1:65-2:10.)

In some prior art NAUs, there was a "separate TDM channel[ ] between each packet application module and the [central] packet manager" (2:15-19), meaning a "fixed fraction of the TDM bandwidth" would be set aside for communicating data from one packet module to the CPM. These prior art packet modules thus transmit to the CPM using their own preassigned slot(s) on the TDM bus. The CPM then "aggregates" the data from the separate packet modules arriving in separate channels and sends this data to the NAM in a single TDM channel sized to match the portion of the network facility bandwidth that is allocated to packet data. (2:24-27.) The CPM may receive more data at one time than can fit into the fixed network facility packet bandwidth, in which case it may exercise "flow control to throttle the packet traffic," meaning it tells the packet modules when they are permitted to transmit data. (1:65-2:14.)

Prior-art reliance on a CPM has disadvantages which the '858 purports to overcome with a design that completely eliminates this component and the need for it. Instead of relying on a CPM that assigns channels (time slots) to individual packet modules, the '858 design permits "multiple packet data sources [to] share a single TDM channel," which is a group of slots "pre-assigned to all the packet data" during "initialization," when the NAU is powered up. (2:45-46; 3:51-53; 4:56-61; 9:25-27.)[6] "This packet-dedicated portion of the bandwidth is referred to as a 'multiple access packet channel'"(MAPC), and is sized to have a bandwidth that "is closely matched (or equal) to that allocated for packet traffic across [the] network facility." (4:58-59;

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6 The "TDM channel" concept is depicted in Fig. 5 — repeating slots 1-6 form a single TDM channel, and repeating slots #7-N each constitute individual TDM channels.

4:67-5:2.) No individual packet module is allocated any slot(s) within the MAPC. (4:61-62.)[7]

In the '858 invention, if a packet module "grabs" the MAPC, it "transmits using the full bandwidth" (all time slots) of the MAPC (6:7-10; 5:2-10), which was sized at initialization to correspond to the packet bandwidth of the network facility. Thus, the '858 does not have or need a CPM to help control flow (2:5-10), but rather "flow control is now distributed among the packet . . . modules." (6:13-14.) In addition, the '858 does not use a CPM to decide which packet module can transmit over the TDM bus at any one time. Rather, the '858 packet modules decide among themselves how to share the MAPC by exchanging signals ("PREQ" and "PHOLD") between themselves over the TDM bus. (10:31-33; generally, 8:8-10:43.) All of these functions of the CPM are therefore "distributed among the various packet application modules" (3:55-59), and the CPM itself is completely eliminated. A "distributed packet manager" is thus part of each packet module and has an interface that "synchronizes packet data . . . for insertion into an appropriate time slot on [the] TDM bus," meaning that the data is inserted into the MAPC when no other packet module is using it. (4:25-28.) The snake-like line on the left side of Figure 5 depicts the entire MAPC (slots 1-6) currently being used by one of the packet modules over several frames. The remaining portion of the TDM bus, depicted on the right side of Figure 5, can be used by synchronous modules.

1. Components Of '858's Improved NAU & Its Bus Between Its Components (1A-C, I, O)

"Apparatus" or "equipment" in the '858 claims is to a NAU which contains "modules" (disclosed "circuit boards") each having its own "interface" to a TDM bus, and a NAM which

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7 The "single TDM channel" refers to a "fixed fraction" or time slots (in Fig. 5, slots #1-6) allocated to the MAPC. "Share" means that all of these slots are treated as a single channel so that no slot within the MAPC is assigned to any particular packet module.

sends data from the NAU onto a network facility. This construction and construction of the NAU components are explained below.

The claimed **data communications apparatus** and related terms [1A] mean "network access unit." An improved NAU is the premise for this entire invention. (*See, e.g.*, Cols. 1-2; Figs. 1-3; 3:20-22.) A NAU was "known" (1:12-13) as a device that manages "the flow of data between a local . . . network and a network facility." The '858 claims to have improved it. Consistent with the NAU, its **bus** [1B] is described in the '858 and defined in dictionaries as "hardware" line(s) within the device "used for data transfer among [its] components." (C27, 30)(Figs 1-4.) This definition for "bus" is plainly apparent from the '858's requirement that its packet modules send PREQ and PHOLD signals to each other over internal buses to manage communications. (8:8-12.) No description exists to support Rembrandt's expansion of "bus" to mean any "path" that need not be within a unit to connect its components. The plain meaning of **bus** as hardware for transferring data among components of a device is plainly applicable here.

A **time division multiplexed bus** [1C] is "a bus having its bandwidth partitioned into a repeating sequence of time slots defined to be used in the same way during each repetition, whereby only one data source can successfully transmit over the bus at any one discrete interval of time." Figure 5 shows repeating time slots being used the same way for each repetition, or frame. Slots 1-6, assigned at initialization, are shown as being used for the MAPC in all frames. Only one data source can successfully transmit over the bus at any one interval of time because there is only one bus for outbound transmission. (2:21-23; 4:25-31; 6:53-56.)

Packet data source[] coupled to the time-division multiplexed bus [1 I] is a "circuit board" within the unit (7:47-53) that "includes its own TDM interface" (2:58-59) "couple[d] . . . to TDM bus." (3:53-55; Fig. 4.) And, as the term suggests, a packet data source (or module) in

the '858 only sends packet data. This is because packet and synchronous data are different (1:16-40), as is the manner in which packet versus synchronous modules transmit data onto the bus (sharing a MAPC with unassigned slots versus using pre-assigned slots). (4:56-65; 5:28-30.)

Network access manager (NAM) [1 O], not to be confused with the eliminated CPM, resides inside the NAU and provides the interface between its TDM bus and the network facility. Rembrandt argues that the NAM controls "the assignment of synchronous and packet data portions on a TDM bus" but seems to omit the clarifying point that the entire MAPC is "pre-assigned" for use as a single channel for packet data, where this is done only at "initialization." (4:56-61; 9-28.) ***No*** individual slot within the MAPC is assigned by the NAM. (4:62-65; 5:2-10.) Once the MAPC is "pre-assigned" as an entire packet channel (wherein individual slots remain unassigned), that assignment remains fixed for each frame. There is no disclosure that the MAPC can be re-assigned without a new initialization, nor is there reason to re-assign the MAPC because the network facility and its packet portion are "fixed" in size. (6:33-35; 1:67-2:1.) This "preassignment" of the portion of bandwidth to be used for the entire packet channel is *not* to be confused with what happens within that channel, *i.e.*, the different function of sharing unassigned slots within the channel, which is handled solely by the packet modules themselves.

2. Distributed Packet Manager & Sharing Eliminates Central Packet Manager (1K-L)

Plurality of packet data sources . . . that share the allotted bandwidth . . . [1K] means "without needing a central packet manager, each packet data source treats the allotted bandwidth as a single channel by contending for use of the entire channel in which no time slot is assigned to any particular packet data source." The '858 describes packet data sources "treat[ing]" the "allotted bandwidth" as a single channel (the MAPC) by "contend[ing] for [use of] the entire TDM bandwidth allocated to packet data" (2:56-57; 4:63), whereby no time slot is assigned to

any particular packet data source. (4:58-62.) The '858 explains how this technique eliminates the need for a CPM, since the CPM's function of controlling traffic flow and aggregating packet data from separate channels into a single channel is eliminated. (2:4-10, 46-48.)

Distributed packet manager [1L] has no plain meaning and represents "the inventive concept" according to the '858. (3:51-67.) The '858 says this is a component "in the respective packet . . . modules" (3:60-61) that permits them to "share" the allotted bandwidth. Both the '858 and its file history confirm that sharing is achieved *without* a CPM. (2:45-48, 55-57; 3:4-7, 51-61)(F1055; 1061.) The distributed packet managers "share" by communicating with each other (the "PREQ signal and PHOLD signal") across a bus in the NAU to manage which module will be "granted access" to the MAPC "for a period of time." (8:8-9; 10:32-34; 7:5-7.) Rembrandt's construction strips out "managing," instead having each module simply deciding what it alone will do, but there is ***no*** description of such an invention anywhere in the '858 patent. The ***only*** way management is "distributed" in the '858 is by packet modules communicating. The PHOLD signal communicated from another packet module prevents a given packet module from attempting to send, not something in its own packet module.

3. "Portion" Of Bandwidth Allotted To "Packet Data" And Related Terms (1D-E, P)

A **portion**, according to both common usage and the '858, means "a fixed amount less than the whole." Figure 5 shows a "portion" (slots 1-6) of the total bandwidth pre-assigned to the MAPC. (4:56-57.) This portion is "fixed" because it cannot be changed except during "initialization," and because the packet sources "are contending for a fixed network pipe" (*i.e.* the network interface) having a "'fixed amount of TDM bandwidth' allocated for packet data." (6:18-20, 33-35; 9:26-28; 1:67-2:1.) **A counter** . . . " [1P] only counts those" slots "assigned" to

the MAPC which is referred to in claim 11 as the "second portion." (7:35-38.)[8]

Packet data [1F] is data that travels in packets according to its plain meaning and the patent, which confirms that "packet" refers to "packet switched networks," a "substrate for packet handling," and packet data "*format.*" (1:20-23; 2:43-45; 11:13-14.) "Synchronous data," on the other hand, was for telephone networks and was not formatted in packets. (*Id.*) Rembrandt's construction of "packet data" as "variable bit rate" is contrary to its plain meaning, the specification, and common sense. It does not even require "packet data" to be in packets.

V. '444 PATENT OVERVIEW

The '444 describes "robust preamble and transmission delimiting" of messages exchanged by transceivers. (1:19-22.) Every message begins with a preamble that contains "a plurality of bits representing communication link control information" ("CLCI"). (3:1-14.) The CLCI bits are encoded as "symbols" for transmission. (7:16-17.) "[S]ilence precedes" the preamble, the "preamble precedes each communication message," and silence follows the "end of each transmission." (2:18-19; abstract; 11:61-63.) "Delimiting" is the ability to differentiate "the beginning and end of a transmission" from the silence that precedes and follows it. (2:20-29; 11:59-63; 14:2-6.) There were "existing techniques" for "message delimiting," but they were not "robust." (2:39-56.) "Robust delimiting enables a receiving transceiver to reliably begin immediately decoding the message at the correct symbol," and to continue decoding "the entire message through the final symbol and then stop[ ]." (2:23-28, 59-67; 11:59-61.)

The '444 preamble "robustly delimit[s] the beginning of the communication message" by sending only the "first symbol . . . using an increased power level." (7:49-53;12:6-10.) The first

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8 "Having a predefined bandwidth" [1G] and related terms means "first" and "second" portions of the TDM bandwidth must be fixed at initialization for these same reasons.

symbol's "energy [is] increased to a point at which noise . . . is unlikely to cause a receiver to erroneously interpret the first symbol **55** as silence," much like a person might start talking in a loud voice to get the listener's attention. (10:15-19.) "The remainder of the symbols" in the preamble "do not have their energy increased." (10:28-31.) The preamble "robustly delimit[s]" the "end of a transmission" by encoding CLCI at a "low bit per symbol rate" to reliably convey information that helps the transceiver determine the "last" symbol. (2:64-67; 11:19-25; 9:60-67.)

Figure 3B shows the preamble as containing 4 separate items of communications link control information which, as the name suggests, control use of the communication channel. (9:35-55.) An "optional administrative header" can follow the preamble, but it is not "part" of it, "and can be used to send information that is neither part of the preamble **40** or any of the data to follow." (6:33-35; Fig. 2B.) User data can follow the administrative header. (6:50-51.)

1. Preamble Used To Precisely Identify The Beginning & End Of The Message (1A)

The "preamble operating to frame the message and delimit the message from silence" means "the preamble includes a first symbol transmitted at a power level higher than all other preamble symbols to precisely identify the beginning of the message and communication link control information used to precisely identify the end of the message." The '444 says that message delimiting was well known in the art, but that the patent's contribution is a "robust" way to delimit by robustly transmitting a preamble to precisely mark "the beginning and end of a transmission" (2:20-22, 39-41, 50-56, 61-68; Title.) The claims require that their limitations achieve this allegedly novel "robust transmission delimiting," thus the claim limitations must be construed consistent with what is described in the specification. (A1,2.) The '444 instructs that robustly delimiting the beginning of a message means sending the "first symbol . . . using an increased power level" compared to the "remainder" of the preamble symbols which "do not

have their energy increased." (7:49-53; 10:15-31; 12:6-10.) Moreover, the only decoder taught by the '444 sends the "first symbol" to a "[g]ain reduction element [that] reduces the gain of the first symbol." (16:35-38.) The '444 also describes "robustly" delimiting the end of a transmission with a "receiver [that] uses" the "lower rate" preamble CLCI "to determine the symbol that is the last in the message." (2:61-67; 7:31-42; 11:19-22.)

2. "A Plurality Of Bits Representing [CLCI]" Refers To Information In Figure 3B (1B)

CLCI refers to bits representing information as depicted in Figure 3B. The bits convey "information" about the (1) "transmit rate" of the "information following the preamble" (10:32-34; 15:30-35); (2) "maximum receive rate" at which the transmitting transceiver "can receive" (10:57-59); (3) "address" (required where there is more than one remote)(10:66-11:2); and (4) message "format" (11:16-19);(*see also* 9:35-55.) The receiving transceiver (receiver) has specific components to decode each of these four items of information. (*See* Fig. 5, elements **317**, **319**, **322** and **326**; 16:55-58.) This information is decoded by the receiver to *control* communications over the link. For example, "the receive rate bits are *commands* that instruct the opposite device to increase or decrease its transmit rate." (10:60-62.)

The CLCI must be construed to mean the four items of Fig. B because the applicants coined the term CLCI and only described a preamble which contains these items of information. (A7, 1-2.) If CLCI is not construed as these items, it would be impossible to know where the preamble ends and the optional administrative header begins when encoding. The administrative header can contain control information: "the control transceiver could use messages conveyed by the administrative header **42** to direct remote devices to activate or deactivate various ATM virtual circuits" (6:46-49.) Yet, the '444 says that the administrative header is not part of the preamble (6:33-35.) Any other construction renders the claim indefinite. (A14).

Rembrandt argues CLCI is a "programmable pattern of bits to convey information regarding the communication," a concept that does not appear in the '444 at all. The patent describes a preamble containing separate items of control information, not a single pattern of bits. Further, Rembrandt's construction eviscerates "communication link control information" (information which the receiver learns by separately decoding each item of the CLCI), by asserting it is merely "information regarding the communication." "Regarding" is not "controlling."

3. "Maximum Rate Capable Of Being Supported" Is Specified In CLCI (1C)

"Encode the preamble . . . at a lower bit per symbol rate relative to the maximum rate capable of being supported . . ." means the encoder in a transmitting transceiver encodes a preamble at a lower bit rate than the "maximum receive rate" specified in the preamble it just received. (9:60-67.) A transceiver receives a preamble containing CLCI specifying the "maximum receive rate" that the transmitting transceiver can handle over "the line." The transceiver then transmits a message back to the transmitting transceiver at a rate no greater than this maximum rate, as well as a preamble transmitted at less than the maximum rate. (10:57-65.) Rembrandt's construction ignores the fact that the maximum receive rate capability is transmitted as part of the CLCI, which is an element of the claims. (10:57-65.)

4. "Means For Applying A Preamble . . . Including . . . [CLCI]" In § 112, ¶ 6 Form (1B)

The parties agree that §112, ¶ 6 applies. The proper construction must include elements **201**, **202**, **204**, and **206,** which store CLCI and **214**, which selects CLCI bits. These elements are required to perform the claimed function of applying a preamble containing CLCI, as opposed to applying merely an ordinary preamble. (Fig. 8; 15: 4-57)(A12-13.) Structures Rembrandt

associates with the means lack these elements, and would simply apply a preamble that need not have CLCI.

VI. '903 PATENT OVERVIEW

The '903 system relates to the problem of noise added to a transmission line that impacts the signal-to-noise-ratio (SNR) in different ways depending upon whether the noise is added at the transmitting end or receiving end. Often in telephone lines, a signal's strength begins to decrease, or "roll off," at frequencies higher than a "break frequency." *See* W in Figs 2a and 2b. If noise is added at the transmitter (before a signal is transmitted in the telephone channel), the noise signal will also roll off (Figs. 3a, c.) But, if noise is added near the receiver, only the signal, not the noise, suffers high-frequency roll-off. (Figs. 2a, c.) Therefore, depending upon where in relation to the telephone channel the noise is added, noise will have differing impacts on the SNR, a ratio ideally kept constant across all frequencies (2:24-29.) According to the '903, adequate prior art methods existed for emphasizing a signal before transmission ("pre-emphasis") to achieve a constant SNR when there is "no roll-off" (Fig. 1) or when "noise [is] injected subsequent to . . . roll-off" (Fig. 2), but, prior art methods were inadequate at identifying and differentially treating noise injected "prior" to "roll-off." (Fig. 3; 1:23-26; 37-44; 2:58-63.)

The '903 solution is a modem at the receiving end having a "noise spectrum generator circuit to calculate a frequency-dependent noise spectrum." (2:45-53.) This circuit receives a series of signals over time and "calculate[s] an error signal which is representative of the noise signal" at each point in time. (3:28-34.) A discrete Fourier transformer (DFT) in the circuit then "converts" the succession of these "noise signals in the time domain . . . into the noise spectrum in the frequency domain." (3:42-46.) The noise spectrum plots noise signal strength versus frequency, showing how noise varies at different frequencies across the range. (3:63-68.) The

receiver chooses 5 points from the full 22 point noise spectrum that span the usable frequency of a telephone line, and sends them back to the transmitter "via the secondary channel." (2:47-50; 4:54-61.) "The transmitter uses this [noise spectrum] information to compute the new pre-emphasis coefficients . . . and uses the result on its subsequent transmission." (2:50-53.)

1. Noise Spectrum/Parameters From A Frequency Domain Plot Of Noise Signals (1A-B)

Noise spectrum means a "frequency domain plot of the noise signals across a range of frequencies." The applicant explained that the "noise spectrum" is made by a DFT that "converts . . . noise signals in the time domain . . . into the noise spectrum in the frequency domain," thus providing a "frequency domain plot of the noise signal" across a range of frequencies. (3:42-46, 63-68; 4:54-60.) And because the fundamental goal of the invention is to account for "frequency-dependent signal-to-noise ratios," the noise must be captured at frequencies across the relevant frequency spectrum. Rembrandt's construction, "noise signal values," ignores the plain distinction between "noise signals in the time domain" and "the noise spectrum" calculated by converting those signals into "the frequency domain." (3:42-45.)

Generating parameters responsive to said noise spectrum means points are "chosen" from the noise spectrum. (4:57-58.) The '903 instructs that the only data "transmitted back to the transmitting modem" is "a frequency domain plot of the noise signal" at "5 frequencies . . . *chosen* from a 22 point discrete Fourier transform calculation so as to span the usable frequency of a telephone line." (3:65-66; 4:55-60.) Rembrandt says this term only requires values "based upon the noise signal at given frequencies" but the '903 only describes "choosing" points from a more complete noise spectrum. There is no support for the construction Rembrandt proposes.

2. Adjusting Frequency Dependent Characteristics For A Constant SNR (1C)

Adjusting frequency dependent characteristics . . . requires adjusting a transmitted

signal, using preemphasis coefficients computed from the noise spectrum parameters (5:21-22), to maintain an SNR that "remains constant" at different frequencies in the "received transmitter signal," whether noise is injected before or after roll-off of the line. (2:24-37.) The "ideal pre-emphasis" is flat in the situations in Figs. 1 and 3 to maintain the constant SNR at all frequencies. But, maintaining a constant SNR in the received signal in the Fig. 2 situation requires "an increasing gain . . . above the frequency w_0" to boost the transmitted signal above the roll-off frequency. The purported invention of the '903 is the ability to determine the ideal pre-emphasis based on the noise spectrum and whether the "noise is injected" "prior" to or "subsequent to the . . . roll-off of the communications line." (1:23-30, 37-44; 2:15-44; Figs. 2-3.)

3. The Only Antecedent In Claim 21 For "Output From Said Transmitting Step" (1 I)

Claim 21's "**output from said transmitting step**" is the transmission from the transmitting modem in step 1, the only antecedent for "*said* transmitting step." This output will be (but has not yet been) adjusted in step 2. While transmitting before adjusting may seem odd, the language follows Fig. 5, which shows a transmitter "TX" (**14**) before the pre-filter. The element **receiving said output from said first transmitting means** also refers to the "output from said transmitting step" as construed above. This claim is poorly and invalidly written, mixing "means" apparatus clauses with its method steps. In any case, from its plain language, the only antecedent for this term is the previously construed "output from said transmitting step."

4. "Means" Including Structures Necessary To Perform Their Functions (1B, D-H)

First transmitting means in the transmitting modem, including adjusting means . . . (1D) refers, pursuant to §112, ¶6, to "conventional modem transmitter **14**," "nine-tap filter **70**" (3:49-54), "delay blocks **71-79** . . . multipliers **81-89**" and "adder **90**" (4:37-42; Fig. 6), all of which are required to perform the claimed functions. Although Rembrandt implies that "first

transmitting means" is not Section 112, 6, it uses "means" language and this element performs the function of providing an output to be adjusted. Further, Rembrandt's construction ignores the disclosed structure performing the "adjusting" function: "nine-tap filter **70**" elements. (4:35.)

Rembrandt agrees that **generating means . . .** (1B), pursuant to § 112, ¶ 6, is "noise spectrum generator circuit **50,**" which must necessarily "include the complex DFT block **68.**" DFT block 68 "calculates" a "frequency domain plot of the noise signal" "at 709, 1145, 1800, 2455 and 2891 Hertz . . . chosen from a 22 point discrete Fourier transform." (4:55-58; 3:63-68.) Rembrandt's construction omits DFT structure necessary for the transformation it performs.

Second transmitting means . . . (1G) transmits "said parameters to the transmitting modem" pursuant to § 112, ¶ 6, using low rate "secondary channel transmitter **38**" that transmits "on a sideband of the primary channel at a low transmission rate through line **42.**" (4:1-5)(C37, 1:29-33; C39 abstract, C49 at 2:38-42.) Rembrandt's proposed structure, "a second transmitter," simply ignores the secondary channel transmitter 38 disclosed for this function. *Id.*

Computing means . . . (1H), pursuant to § 112, ¶ 6, is "transmitter circuitry" in the transmitting modem, as specified in the Cable Parties' claim chart. Rembrandt's construction is incorrect in two ways. First, it does not expressly acknowledge that the computing structure is part of the transmitting modem, even though that is undeniable from Fig. 5, the whole disclosure and claims themselves (the "parameters" used for computing have been transmitted back to the transmitting modem). Second, while Rembrandt includes the algorithms at 4:66-5:17, it fails to account for "comparator **28**" programmed to "subtract[] . . . the previous frequency domain plot of the noise signal" (previous parameters) "stored in shift register **26**" from the current plot (current parameters), and related structure. (4:7-27.) These structures are in the transmitting modem and needed for "computing the pre-emphasis coefficients from said parameters."

VII. '159 AND '234 PATENTS OVERVIEW (All Citations Are To The '159)

The '159 and its '234 divisional share a common specification directed to an apparatus and method for remotely updating all the software executed in a modem. In the prior art, one way to change software on a modem was "to imprint the program into read-only-memory integrated circuits and physically install the circuits into the equipment. The problem with this approach is that updated versions of the program require the creation of new sets of read-only memories and" the physical installation of these new memories into the modems. (1:22-27.) Prior art also updated modems by sending new software to them over communication lines. (1:28-31.) However, those remote update approaches allegedly suffered from a similar deficiency -- while many programs could be remotely updated, the "'boot-up' segments [the programs executed to initialize the modem when it is powered on] and program segments that are necessary to maintain the communication" with other modems could not be updated during a download. (1:51-55.) These programs, coined the "'essential programs' (EP)" by the inventors, were stored in a non-volatile read-only memory. (1:56-58.) They could not be changed during a download because the "possibility of power loss" could destroy the modem's ability to boot and communicate (explained below). (1:49-63.) In addition, the EP set itself is being executed during software downloads, making it difficult to update by a download operation. (*Id.*)

The inventors' solution permits "all programs — including the EP set of programs" to be downloaded to the modem over a communications line while requiring the modem to have only a small amount of memory. (2:39-46.) The modem need only have "a single memory arrangement," which may comprise as few as "two blocks," that "must" be nonvolatile, meaning it retains its contents when the power is turned off. (2:43-46; 4:16-17.) The patent says that any other memory a modem might have is "irrelevant" to the invention. (2:61-67.) This ability to use

only a single memory of limited size requires that a new EP set (called "EP_{new}" in the '234 claims) be separately downloaded into a location of the modem's nonvolatile memory other than where the old EP set ("EP_{old}") is stored. (4:15-36.) Thus, at this stage in the update, the memory only need hold EP_{old} and EP_{new}. (3:62-63.) The modem then immediately stops executing EP_{old} and begins executing EP_{new}, and it is EP_{new} that then controls the download of all of the remaining new programs in the entire program set. (2:9-19.) By changing control from EP_{old} to EP_{new} immediately after the latter is downloaded, the nonvolatile memory need only be large enough to hold one entire P program set at one time. By contrast, if EP_{old} downloaded the entire new program set, the memory would have to be large enough to hold EP_{old}, performing the entire download, *plus* the *entire* new set of downloaded programs (called "P_{new}" in '234 claims.)

Change in control from EP_{old} to EP_{new} during a download is achieved with an updateable register arrangement shown in Fig. 1 (processor **12**, register **40**, address modifier **30**). This arrangement holds an EP_{new} address that is called both a "start address" and an "offset address" to reflect its two different functions. (2:9-8; 3:57-4:44.) This stored address is the difference between where EP_{new} resides in memory and where EP_{old} resides in memory. It functions as an "offset" because the address executed in EP_{old} just before control is transferred plus the address in register **40** equals the address of the "predetermined logic point" in EP_{new} that receives control. (4:4-8.) This address also functions as the "start" address of EP_{new} because the modem's boot address (which, prior to the update, is "0" in the disclosed embodiment (3:43-44)) plus the address in register 40 equals the start address of EP_{new} that the modem will execute after it is powered on (*i.e.* the boot-up address). (3:57-58.) This is the reason why "[i]f register **40** is to contain the offset address for a substantial time after downloading is accomplished, then its contents must be protected" by storing it in nonvolatile memory. (4:37-40.) If there is power

loss, the modem must know from which memory location (EP_{new} or EP_{old}) to start the reboot process. (4:38-51.)[9] This new "start" address was critical to solving the "possibility of power loss" problem that allegedly prevented updating the entire EP during a download in the prior art.

Fig. 1 depicts the structure for holding and using the starting/offset address. As in prior art, the memory location of the next instruction to be executed by processor **10**, as determined by the processor's program counter, is placed on bus **14**. (2:54-55; 3:19-27.) In the prior art, bus **14** would extend to memory **20**, which would return the contents of the identified memory location to the processor using bus **11**. (2:51-55; 3:16-19.) Fig. 1 differs from such "conventional processor structure[s]" in that "address modifier **30** is interposed between processor **10** and program memory **20** . . . ." (2:54-58.) "Address modifier **30**" adds the offset/starting address from register **40** to the address supplied by processor **12**'s program counter on bus **14**, and supplies the modified address to memory **20** via bus **15**. (2:55-61; 3:16-30.)

In operation, the modem receives an instruction on communication line 12 to update its program set in the form of "a command . . . to branch to the subroutine in the EP set that installs new EP sets . . . ." (3:52-54.) In one disclosed embodiment, the starting/offset address of EP_{new} is also sent to the modem. (3:57-60.) "[T]he new EP set of programs are downloaded," at which point "two EP sets must temporarily coexist in memory **20**." (3:56-57, 63.) The offset address is then loaded into register **40**, which has "[t]he immediate effect of . . . transfer[ring] control to the newly installed EP set . . . so that communication can continue seamlessly." (4:2-8.) "Once operation proceeds under control of the new EP set of programs," the "processor **10** . . .

---

9 On the other hand, if EP_{new} is always copied to memory location 0 before it is used to download remaining new programs, register **40** need not be nonvolatile because if there is a power loss, rebooting will always start at location 0. (Fig 3; 3:40-44; 4:44-59.)

account[s] for the offset present in register **40** and loads the remainder of programs destined for memory **20** in addresses higher than" the address range of the new EP set (modulo M). (4:9-14.)

1. The '159 Claims Require Program Execution From Nonvolatile Memory (1A-C)

A. Each Independent Claim Includes The Essential Program Set (1A)

Each claim includes a "program" element properly construed to include the EP set:

> Claims 1 and 6: "**a set of programs** . . . that are executed when the system needs to be *initialized*" and an "*alterable storage means*" *that holds the* "*starting address*" of these programs;
>
> Claim 8: "**a program module** . . . that, when activated by said processor, effects communication with said port" and "*alterable means for setting the starting address* of said program";
>
> Claim 10: "**a set of programs** that are executed when the system needs to be *initialized* and a program for controlling communication" and "means for activating said program for controlling communication . . . ."
>
> Claim 18: "**a set of program means** stored in said memory that are *activated when the system needs to be updated* with a new set of programs . . . ."

Although the "program" language in these claims differs slightly, each refers to the EP set. Each requires a "set of programs" or "program module" that (i) "initialize[s]" the modem (meaning it boots the modem, as explained in the Overview); (ii) is activated when the system needs updating; and/or (iii) has its starting address stored by an alterable means. The disclosed EP set satisfies all these criteria, and is the only disclosed program set or module that satisfies *any* of these criteria. Furthermore, in prosecution, the inventors confirmed that "programs" in claims 1, 6, 8 and 18 (then labeled 1, 6, 8 and 22) means "initialization programs, *including* the communications programs" (which is the EP set):

> The present invention, as defined by independent claims 1, 6, 8 and 22 . . . includes . . . a set of programs stored in the memory that are executed when the system needs to be initialized." (F724)

> Neither [prior art reference] suggests nor teaches the ability to provide a new downloaded initialization program which can be activated by using memory remapping . . . In the present invention . . . ***the initialization programs, including the communications programs*** can be changed while the system is operating . . . ." (F727.)

B. The Essential Program Set Is Executed From Nonvolatile Memory (1A-C)

According to the specification, the EP set "must" be executed from nonvolatile memory. "The processes carried out by the FIG. 1 apparatus are effected by *executing* a sequence of *instructions* that the processor receives *from program memory **20***" where "memory **20** *must* be non-volatile." (3:16-19; 4:17.) Indeed, any memories a modem might have other than the nonvolatile memory are expressly taught as "*irrelevant*" to the invention. (2:61-67.) As described above, switching execution from EP_{old} to EP_{new} while both are in nonvolatile memory 20 at the same time is fundamental to the invention. (3:40-44; 3:62-63; 4:2-8.)(A1-2, 9.)

It is not surprising, then, that all of the asserted claims also expressly require that its "set of programs," "set of program means" or "program module" (which, as above, all refer to the EP set) be executed from nonvolatile memory. Claims 1 and 6 require the EP programs be "stored in [] memory" and "executed when the system needs to be initialized." The memory must be "not volatile" (claim 1) or "non-volatile" (claim 6). Claim 8 requires the EP programs be "in said memory," which is "non-volatile" and "activated by said processor." Claim 10 requires a "non-volatile" memory "containing" the EP set that is "executed" and claim 18 requires the EP set to be "stored" in "non-volatile" memory and "activated."

Prosecution history confirms. To distinguish prior art from claims 1, 6, 8 and 18 (then numbered 22), the applicants argued that these claims require "a memory . . . which is not volatile and which is the only program memory in the system, and a set of programs stored in the memory that are executed when the system needs to be initialized." (F724.) The applicants

further argued that prior art did not teach a nonvolatile memory having an initialization program "*so that one of the sections could be erased while the other section was in active use . . . .*" (F727.) Similarly, for claim 10 (then 13), applicants argued that "[t]he Examiner has failed to point out any prior art which suggests that the program for controlling communication is also within the memory block being remapped." (F404.)

2. "Alterable Storage Means" Is Register 40 *And* The Bus Connections Of Figure 1 (1E)

Claim 1 calls for an "alterable storage means for holding a displacement multi bit memory address that is used to point to the starting address accessed by the processor when initializing." Claims 6 and 18 share similar means-plus-function limitations. "[D]isplacement" address refers to the disclosed multibit "offset" address, and "initializing" refers to booting the apparatus with the EP set. The offset is added by "address modifier **30**" to a memory address supplied by "processor **12**," when the device is powered on, in order to then point to the very first instruction in nonvolatile memory that the processor will execute. The claimed functions require register **40**, which is "alterable" whenever a new EP set is downloaded and must have bus lines connecting it to processor **10** (to receive the offset address) and modifier circuit **30** (which does the adding) to perform the function of being "used to point to the starting address."

3. Claims 8 & 10 Need Structure To Download Through A Communications Port (1G-J)

Claim 8 requires an "operationally alterable means for setting the starting address of said program, which address is supplied to said system via said communication port." "Said program" refers to the "program module" of the preceding claim limitation, which is the EP set as explained above. As described in the Overview, the "starting address" of the new EP is received while the old EP is executing in nonvolatile memory, and is the address that, when

added to the address from the processor, yields the first memory location accessed by the processor when the system is booted. This construction comes right from the specification.

"Means" must be construed to include structures necessary to perform claimed functions. (A12-13.) Structures necessary to perform "downloading . . . through a communication port" include the communication port coupled to external communications line **12**, processor **10** which receives the address, offset register 40 which stores the offset address, and modifier circuit **30** which performs the adding necessary to point to the starting address. Nonvolatile memory **20** containing an EP set of programs including software implementing Figure 2 or 3 steps also is required because it is the EP set and those steps that control operation of the claimed functions. Buses **11**, **13**, **14**, and **16** perform the required communications among components.

Claim 10 requires two means: a "means for activating said program for controlling communication," and a "means for . . . receiving information through said communication port to modify the programs in said memory, said information including the program for controlling communication through said communication port and a command that is executed by said processor effectively when it is received." The function of the "activating . . ." means is straightforward: activating the program in the nonvolatile memory that controls communications, which according to claim 10(b) and the specification, must be done over the communication port. Cable Parties' construction of the "receiving" means function comes right from the specification and the claim language itself. The memory must be "nonvolatile" for reasons already explained. The "program for controlling communication" that is modified is the currently "activated program" (the EP) because that program controls the update. Finally, the command must be "received directly into the processor and executed," exactly as is shown in Fig. 1, because the claim requires that the command be "executed by said processor effectively when it is received."

The only way to accomplish this is to feed the command directly to the processor, without any intermediate storage, exactly as described in the specification.

Structures necessary for this function include: communication port coupled to external communications line **12**; processor **10** which receives and executes the command; register 40 and modifier circuit **30** which point to the address of the EP set that controls modification of programs; nonvolatile memory **20** containing an EP set of programs implementing the algorithm of either Fig. 2 or 3 because it is the EP set and algorithms that control the claimed functions. Buses **11, 12, 13, 14, 15, 16** are needed for these components to communicate.

4. The System Updates Its Entire Nonvolatile Memory During The Download (1D)

'159 claims require a system having nonvolatile memory that may be "completely updated in its entirety." As the specification shows, its system is programmed to erase the entire memory, including the EP_{old} program set, during "the downloading process of this invention." (4:25-36; 49-59.) The patent's updateable "address modifier" circuit switches execution from EP_{old} to EP_{new} during a download, allowing the full memory to be overwritten yet conserving size. (*Id.*; 4:4-14.) And, in prosecution, the Examiner rejected claims over Beaverton because its EEPROM (nonvolatile memory) satisfied this limitation. (F738-40.) The applicants overcame the rejection by arguing that even though Beaverton used "a system in which all of the memory is" nonvolatile and therefore *could be* completely erased and overwritten, the Beaverton system did not enable this function to be performed in operation. (F748-49.)

5. <u>'234 Patent</u>: "Stored Program Controlled Apparatus . . . Memory" Is Nonvolatile (1A)

The memory of '234 claims 1 and 5 stores the essential EP set and all other programs of the apparatus. This is the memory that the specification says "***must***" be nonvolatile (4:16-17), the

only memory having any applicability to the invention. (2:51-67.) "Read/write" memory was ***"irrelevant."*** Under this disclosure, the claimed memory must be nonvolatile. (A1-2, 9)

6. P_{old} Assists With Downloading P_{new} Into The Same Nonvolatile Memory (1B)

'234 claims 1 and 5 require "installing a new set of communication programs P_{new} into a stored program controlled apparatus that includes a communication port and a memory . . . with the aid of a set of communications programs P_{old} already resident in said memory," where "P_{old} contains a subset of programs EP_{old}" and "P_{new} also contains a subset of programs EP_{new}." A further limitation requires "installing the EP_{new} programs in a first area of *said memory*," where "said memory" refers to the same nonvolatile memory P_{old} is "already resident in." The nonvolatile memory is the only memory in the claims and relevant to the invention. The limitation should be construed to mean "P_{old} programs executing from the nonvolatile memory assist with downloading P_{new} programs for use in the same nonvolatile memory." This invention is to techniques that segment a memory to download an entire new program set into that same memory, which has an operating program set, to update the entire program memory. (A17-19.)

7. The '234 Stops Executing EP_{old} And Immediately Begins Executing EP_{new} (1C)

The '234 step of "altering operation of said apparatus to execute the EP_{new} programs instead of the EP_{old} programs" means, as explained above, that "the apparatus stops executing the EP_{old} programs and immediately begins executing the EP_{new} programs from nonvolatile memory so that communications can continue seamlessly." As the specification explains, "[t]he immediate effect of loading the offset address into register **40** is to transfer control to the newly installed EP set. That means that the program in the new EP set to which control is transferred, must be at a predetermined logic point so that the communication can continue seamlessly." (4:16-20.)

8. The '234 Executes EP_{new} To Download And Store Remaining P_{new} Programs (1F)

The claims require "altering operation of said apparatus to execute the EP_{new} programs," after which "installing the remaining programs of said P_{new} set of programs" occurs. The "installing" step must mean "the EP_{new} programs are used to install the remaining programs of the P_{new} set of programs." The specification explains how "the most recently downloaded EP set" is used to "download[] the remainder of the new package." (2:22-25; Abstract; Figs. 2-3.) The "remaining programs of said P_{new} set of programs" refers to the "subset of P_{new} programs remaining to be transmitted that does not include previously installed EP_{new} programs." The claims require EP_{new} to have been sent already, and that is the plain meaning of "remaining" in the claims. The Examiner's reasons for allowance were also based on this construction. (F971.) Under this record, the order of steps must be followed under Federal Circuit law. (A3-5.)

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Dated: June 4, 2008

CERTIFICATE OF SERVICE

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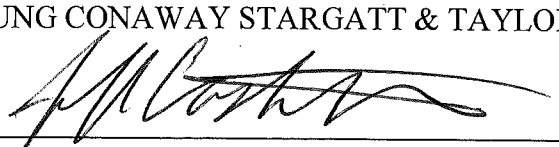

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EXHIBIT 1

U.S. Patent 5,852,631 ("'631 Patent") Claim Construction

Group A: "calling modem" & related terms[1]

'631 Group A Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(a), 6(a),10(a) D: 3-5, 8-9	calling modem	Rembrandt does not believe this term requires construction. In the alternative: a communication device that begins the process of establishing or attempting to establish a connection with another communication device	modem operable with ITU V. standards that places a call to an answering modem over a telephone network (*i.e.*, cellular or PSTN)

Group B: "answering modem" & related terms

'631 Group B Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(a), 6(a),10(a) D: 3-5, 8-9	answering modem	Rembrandt does not believe this term requires construction. In the alternative: a communication device that responds to a connection attempt or request from a calling modem [see '631 Group A]	modem operable with ITU V. standards that that answers a call placed over a telephone network (*i.e.* cellular or PSTN) by the calling modem

[1] These charts group terms and phrases having the same or similar language, and having the same or related constructions. The labled claim element subparts correspond to labeling provided in Exhibit A to D.I. 237. This same labeling was used for the parties' Joint Claim Chart. In the claim element(s) column, "I" indicates appearances in independent claims and "D" indicates appearances in dependent claims (in which the phrase to be construed appears by dependence alone or by dependence and express use in dependent claims). For brevity, Cable Parties identify the first instance where a term or phrase appears. Each construction carries through the claim.

U.S. Patent 5,852,631 ("'631 Patent") Claim Construction

Group C: "physical layer modulation" & related terms

'631 Group C Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(a), 6(a), 10(a) D: 3-5, 8-9	physical layer modulation	a protocol that is concerned with establishing the mechanical, electrical, functional, and procedural connection between two communication devices	a telephone network (*i.e.* PSTN or cellular) standard that governs only the establishment of physical layer connections between a calling and answering modem
I: 1(b), 6(b), 10(b) D: 3-5, 8-9	physical layer	the lowest layer of the Open Systems Interconnect (OSI) seven layer model, concerned with establishing the mechanical, electrical, functional, and procedural connection between two communication devices.	This phrase, standing alone, is inappropriate for construction. The relevant phrase for construction within the context of the claim language is set forth in the row above, and in '631 Groups D & E below.

Group D: "physical layer connection" & related terms

'631 Group D Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 6(b), 10(b) D: 3-5, 8-9	physical layer connection	Rembrandt does not believe this term requires construction. In the alternative: physical layer [see '631 Group C] parameters for a connection	connection formed between the calling modem and answering modem upon completion of training and start-up, before any link layer connection is established

U.S. Patent 5,852,631 ("'631 Patent") Claim Construction

Group E: "establishing a physical layer connection between said calling and said answering modems" & related terms

'631 Group E Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b)	establishing a physical layer connection between said calling and said answering modems	Rembrandt does not believe this term requires construction. In the alternative: applying physical layer parameters for a connection between the calling modem [see '631 Group A] and the answering modem [see '631 Group B].	the modems use communication techniques different from data byte transfer (*e.g.* different frequency tones) to negotiate the physical layer modulation and to then establish the physical layer connection

Group F: "establishing a link layer connection between a calling modem . . . and an answering modem" & related terms

'631 Group F Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(a), 6(a),10(a) D: 3-5, 8-9	establishing a link layer connection between a calling modem . . . and an answering modem	applying link layer parameters for the link layer for a connection between a calling modem [see '631 Group A] and an answering modem [see '631 Group B]	connection that is established after establishing the physical layer connection, without transferring data bytes by using telephone network link layer standards (*i.e.*, V.42, V.42bis or MNP)
I: 1(a), 6(a), 10(a) D: 3-5, 8, 9	link layer	the second lowest layer of the Open Systems Interconnect (OSI) seven layer model, concerned with providing the functional and procedural means to transfer data between two	This phrase, standing alone, is inappropriate for construction. The relevant phrase for construction within the context of the claim language is set forth in the above row, and in

U.S. Patent 5,852,631 ("'631 Patent") Claim Construction

'631 Group F Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
		communication devices, and to detect and correct errors that can occur in the physical layer.	'631 Group H below. In the alternative: second lowest layer of a communication protocol that performs error checking functions as well as retransmitting frames that are not received correctly

U.S. Patent 5,852,631 ("'631 Patent") Claim Construction

Group G: "wherein said physical layer connection is based on a negotiated physical layer modulation chosen from said first and second physical layer modulations" & related terms

'631 Group G Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b) D: 3-5	wherein said physical layer connection is based on a negotiated physical layer modulation chosen from said first and second physical layer modulations	Rembrandt does not believe this term requires construction. In the alternative: wherein the physical layer connection [see '631 Group D] is based on the negotiated physical layer modulation chosen from the first and second physical layer modulations [see '631 Group C]	physical layer connection parameters in the calling and answering modems default, based on which physical layer modulation was chosen in the negotiation, to values that were preset in each modem before the modems communicated
I: 6(b) D: 8-9	means for establishing a physical layer connection between said calling and said answering modems, wherein said physical layer connection is based on a negotiated physical layer modulation chosen from said first and second physical	Means plus function claim language to be construed pursuant to 112, ¶ 6. Means plus function term: "means for establishing a physical layer connection between said calling and said answering modems" Function: Establishing a physical layer connection between the calling and answering modems. Structure: Control processor programmed to perform the steps of identifying and applying a commonly supported physical layer communication protocol between the calling and answering modems, or the equivalents. (FIG. 2	Means plus function element to be construed pursuant to 112, ¶ 6. Function – physical layer modulation – *see* '631 Group C above physical layer connection -- *see* '631 Group D above establishing a physical layer connection between said calling and said answering modems – *see* '631 Group E above wherein said physical layer connection is based

U.S. Patent 5,852,631 ("'631 Patent") Claim Construction

'631 Group G Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
	layer modulations	(40 and 42) and FIG. 9 (114, 124, 120, 124)	on a negotiated physical layer modulation chosen from said first and second physical layer modulations – *see* claim 1(b) element in the above row Structure – calling PSTN or cellular modem having a DSP that listens to and creates frequency tones in accordance with a control processor programmed to perform either the algorithm described in Figure 4 or 6, the control processor including a memory that stores the algorithm; answering PSTN or cellular modem having a DSP that listens to and creates frequency tones in accordance with a control processor programmed to perform either the algorithm described in Figure 5 or 7, the control processor including a memory that stores the algorithm
I: 10(b)	logic for establishing a physical layer connection between said calling and said answering modems, wherein said physical layer connection is based on a	Rembrandt does not believe this term requires construction. In the alternative: programming that allows a physical layer connection [see '631 Group D] between a calling modem [see '631 Group A] and an answering modem [see '631 Group B] to be applied based on the negotiated physical layer modulation chosen from the first and second physical layer modulations [see '631 Group C]	Means plus function element to be construed pursuant to 112, ¶ 6. Function – establishing a physical layer connection between said calling and said answering modems, wherein said physical layer connection is based on a negotiated physical layer modulation chosen from said first and second physical layer modulations -- *see* Group C-E above, and claim 1(b) element in top row

U.S. Patent 5,852,631 ("'631 Patent") Claim Construction

'631 Group G Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
	negotiated physical layer modulation chosen from said first and second physical layer modulations		Structure – operating code for implementing either the algorithm of Figure 4 or Figure 6

U.S. Patent 5,852,631 ("'631 Patent") Claim Construction

Group H: "establishing said link layer connection based upon said negotiated physical layer modulation" & related terms

'631 Group H Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(c) D: 3-5	establishing said link layer connection based upon said negotiated physical layer modulation	Rembrandt does not believe this term requires construction. In the alternative: applying link layer [see '631 Group F] parameters for a connection based on the negotiated physical layer modulation	before the modems can transfer data bytes, the link layer parameters in the calling and answering modems default, based on which physical layer modulation was chosen in the negotiation, to values that were preset in each modem before the modems communicated
I: 6(c) D: 8-9	means for establishing said link layer connection based upon said negotiated physical layer modulation	Means plus function claim language to be construed pursuant to 112, ¶ 6. Means plus function term: "means for establishing said link layer connection based upon said negotiated physical layer modulation". Function: Establishing a link layer connection based upon a negotiated physical layer modulation. Structure: Control processor programmed to perform the step of establishing link layer parameters to default values that are based upon the previously negotiated physical layer modulation, or the equivalents. (FIG. 2 (44) and FIG. 9 (114, 124, 120, 124')	Means plus function element to be construed pursuant to 112, ¶ 6. Function – link layer parameters in the calling and answering modems default, based on which physical layer modulation was chosen in the negotiation, to values that were preset in each modem before the modems communicated – *see* claim 1(c) element in above row Structure – control processor in the PSTN or cellular calling modem that operates an algorithm stored in its memory that sets link layer parameters to default values that were preset in the calling modem before the modems communicated if a particular physical layer modulation was negotiated; control processor in the answering PSTN or cellular modem that operates an algorithm stored in its memory that

U.S. Patent 5,852,631 ("'631 Patent") Claim Construction

'631 Group H Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
			sets link layer parameters to default values that were preset in the answering modem before the modems communicated if a particular physical layer modulation was negotiated
I: 10(c)	logic for establishing link layer connection based upon said negotiated physical layer modulation	Rembrandt does not believe this term requires construction. In the alternative: programming that allows link layer [see '631 Group F] parameters for the connection to be applied based on the negotiated physical layer modulation	Means plus function element to be construed pursuant to 112, ¶ 6. Function –establishing link layer connection based on said negotiated physical layer modulation -- *see* claim 1(c) element in top row Structure – operating code for implementing an algorithm that causes a calling modem to default, based on which physical layer modulation was chosen in the negotiation, to values that were preset in each modem before the modems communicated

U.S. Patent 5,710,761 ("'761 Patent") Claim Construction

Group A: "error control negotiation sequences" & related terms

'761 Group A Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(c), 9(b) D: 2-3, 6, 10-11, 14	error control negotiation sequence(s)	A sequence of approaches that a communication device may employ concerning transmission errors, wherein the sequence of approaches may include at least one approach that takes no error control action. error control negotiation sequences: more than one error control negotiation sequence [defined above].	a sequence of different types of error control protocols or a disconnection step that the equipment attempts to use in turn, such that when an attempt to use one such protocol fails, the next option in the sequence is tried

U.S. Patent 5,710,761 ("'761 Patent") Claim Construction

Group B: "selecting one of a number of error control negotiation sequences as a function of a value of at least one parameter from the set of parameters for the physical layer" & related terms

'761 Group B Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(c) D: 2-3, 6	selecting one of a number of error control negotiation sequences as a function of a value of at least one parameter from the set of parameters for the physical layer	Rembrandt does not believe this term requires construction. In the alternative: selecting an error control negotiation sequence [see '761 Group A] based upon the value of at least one parameter associated with the physical layer [see '631 Group C]	after negotiating the physical layer and determining the physical layer parameters, using at least one determined physical layer parameter to select one of multiple link layer error control negotiation sequences
I: 9(d) D: 10-11, 14	selects from memory one of a number of error control negotiation sequences as a function of a value of at least one parameter from the set of parameters for the physical layer		

U.S. Patent 5,710,761 ("'761 Patent") Claim Construction

Group C: "error control" & related terms

'761 Group C Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(c), 9(b) D: 2-3, 6, 10-11, 14	error control	Any of a variety of approaches employed concerning transmission errors that occur on a communications channel.	link layer error control protocol standards (LAPM, MNP, or Buffer) in existence as of May 31, 1995

Group D: "a physical layer of a data connection" & related terms

'761 Group D Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 9(c) D: 2-3, 6, 10-11, 14	physical layer of a data connection	Rembrandt does not believe this term requires construction. In the alternative: the parameters of the data connection associated with the physical layer [see '631 Group C]	ITU V. physical layer industry standard (*e.g.*, V.22, V.22bis, V.32, V.32 bis, V.34) in existence as of May 31, 1995

U.S. Patent 5,710,761 ("'761 Patent") Claim Construction

Group E: "to determine a set of parameters for the physical layer of the data connection with the far-end data communications equipment" & related terms

'761 Group E Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 9(c) D: 2-3, 6, 10-11, 14	to determine a set of parameters for the physical layer of the data connection with the far-end data communications equipment	Rembrandt does not believe this term requires construction. In the alternative: to identify a set of parameters to be used for the physical layer [see '631 Group C] of the data connection between two data communication devices.	before error control, the negotiated physical layer standard is used to determine the physical layer parameters of the data connection

U.S. Patent 5,710,761 ("'761 Patent") Claim Construction

Group F: "negotiating error control . . . in accordance with the selected one of the number of error control negotiation sequences" & related terms

'761 Group F Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
D: 2	negotiating error control . . . in accordance with the selected one of the number of error control negotiation sequences	Rembrandt does not believe this term requires construction. In the alternative: selecting one of the approaches to error control from among those approaches available in the selected error control negotiation sequence [see '761 Group A]	executing the selected error control negotiation sequence to attempt to negotiate link layer error control parameters after the negotiation of the physical layer
D: 10	negotiates error control… in accordance with the selected one of the number of error control negotiation sequences		

U.S. Patent 4,937,819 ("'819 Patent") Claim Construction

Group A: "master unit" & related terms

'819 Group A Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 14(a) D: 2, 11-12	master unit	Rembrandt does not believe this term requires construction. In the alternative: a data communication device that communicates with one or more modems.	device installed in a network that sends messages to its remote units using time division multiplexing without packet headers or delimiters

Group B: "remote units communicating with said master unit in a multidrop configuration" & related terms

'819 Group B Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(c), 14 D: 2, 11-12	remote units communicating with said master unit in a multidrop configuration	Rembrandt does not believe this term requires construction. In the alternative: modems that communicate with a master unit [see '819 Group A] in a network linking multiple units together.	configuration where all inbound transmissions to the master unit contain responses to outbound polls to modems that receive time division multiplexed messages without packet headers or delimiters from their master units
I: 14(a)	communication with a master unit in a multidrop configuration		

U.S. Patent 4,937,819 ("'819 Patent") Claim Construction

Group C: "messages outbound from said master unit" & related terms

'819 Group C Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(d) D: 2, 11-12	messages outbound from said master unit	Rembrandt does not believe this term requires construction. In the alternative: the remote units get messages from the master unit [see '819 Group A]	messages sent from the master unit to remote units using time division multiplexing without packet headers or delimiters

U.S. Patent 4,937,819 ("'819 Patent") Claim Construction

Group D: "application program" & related terms

'819 Group D Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(d), 14(a) D: 2, 11-12	application program(s)	A computer program or process that can be run on a remote communication device, such as a modem.	program that directly meets the needs of a user, such as payroll, inventory control, word processing, accounting, spreadsheet, *etc.*

U.S. Patent 4,937,819 ("'819 Patent") Claim Construction

Group E: "in a time slot assigned to each of said application programs" & related terms

'819 Group E Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(d) D: 2, 11-12	in a time slot assigned to each of said application programs	Rembrandt does not believe this term requires construction. In the alternative: in one of the time slots assigned to the application programs [see '819 Group D]	each application program is assigned to a single time slot per subframe
I: 1(d) D: 2, 11-12	time slot assigned to each of said application programs	An interval of time during which data from an application program may be transmitted.	This phrase, standing alone, is inappropriate for construction. The relevant phrase for construction within the context of the claim language is set forth in the row above.
I: 1(e)	said time slots	said intervals of time	*See* claim 1(d) element in top row

U.S. Patent 4,937,819 ("'819 Patent") Claim Construction

Group F: "a period which is divided into a plurality of subframes, wherein each subframe is divided into said time slots, and each of said time slots is used as an interval in which one of said application programs in said one of said remote units is assigned to transmit" & related terms

'819 Group F Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(e) D: 2, 11-12	a period which is divided into a plurality of subframes, wherein each subframe is divided into said time slots, and each of said time slots is used as an interval in which one of said application programs in said one of said remote units is assigned to transmit	Rembrandt does not believe this term requires construction. In the alternative: with a time period used by the master unit, the time period being logically divided into subframes [see '819 Group H], each of which being further divided into time slots, and where each time slot is assigned to an application program [see '819 Group D] associated with a remote unit as a time period within which that application program [see '819 Group D] may transmit	during initialization, a fixed, repeating length of time called a frame is divided by a user into subframes, each of which is divided into the same number of time slots, where each time slot in a subframe is assigned by a user to a different application, whereby the subframes and time slot assignments repeat from frame to frame

U.S. Patent 4,937,819 ("'819 Patent") Claim Construction

'819 Group F Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 14(c)	dividing a period of a clock in said master unit into a number of subframes, dividing each subframe into a number of slots, each corresponding to transmission times for one of said remote units, and assigning a slot to each of said application programs in said one of said remote units	Rembrandt does not believe this term requires construction. In the alternative: a time period used by the master unit being logically divided into subframes [see '819 Group H], each of which being further divided into time slots, and where each time slot is assigned to an application program [see '819 Group D] associated with a remote unit as a time period within which that application program [see '819 Group D] may transmit	*See* claim 1(e) element in above row

U.S. Patent 4,937,819 ("'819 Patent") Claim Construction

Group G: "master network timing means" & related terms

'819 Group G Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(e) D: 2, 11-12	master network timing means	Rembrandt does not believe this term requires construction. In the alternative: a process or device, such as a network timing control processor, that provides timing for the master unit [see '819 Group A]	network timing and control processor that stores user-input initialization parameters including network clock framing periods, slot and subframe assignments Under section 112, ¶ 6 "master network timing means" is network timing and control processor **12** programmed to implement an algorithm as set forth above. Additionally, it is a coined term and has this definition.

Group H: "subframe" & related terms

'819 Group H Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(e), 14(c) D: 2, 11-12	subframe(s)	Rembrandt does not believe this term requires construction. In the alternative: a portion of a time period	division of a frame that begins and ends within said frame, assigned by a user to a single remote unit
I: 14(c)	each corresponding to transmission times for one of said remote units	Rembrandt does not believe this term requires construction. In the alternative: each time slot is a transmission time for one of the remote units	"each" refers to each subframe. *See* above row.

U.S. Patent 4,937,819 ("'819 Patent") Claim Construction

Group I: "ranging means" & related terms

'819 Group I Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(f) D: 2, 11-12	ranging means	Rembrandt does not believe this term requires construction. In the alternative: a device or process that communicates with the master network timing means [see '819 Group G] that determines the transmission times between the master unit [see '819 Group A] and each of the remote units and sends each of the respective remote units [see '819 Group B] the corresponding transmission time between the master unit and that remote unit.	Means plus function element to be construed pursuant to 112, ¶ 6. Function – communicating with said master network timing means wherein a transmission time between said master unit and each of said respective remote units is calculated and transmitted from said master unit to each of said respective remote units, each of said respective remote units using said transmission time to adjust initiation of said time slots Structure – network timing and control processor **12** (including library table), the ranging and network initialization generator **20**, and ranging receiver **32**, executing an algorithm to perform, during initialization of the master unit before the remote units transmit data, a ranging calculation for each combination of remote unit and application

U.S. Patent 4,937,819 ("'819 Patent") Claim Construction

Group J: "reservation request generator which activates a reservation request bit for requesting an additional time interval inbound to said master unit" & related terms

'819 Group J Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
D: 2, 11	reservation request generator which activates a reservation request bit for requesting an additional time interval inbound to said master unit	Rembrandt does not believe this term requires construction. In the alternative: a reservation request generator in a remote unit that sets at least one bit in a message in order to indicate to the master unit [see '819 Group A] that the remote unit [see '819 Group B] wants additional time to be allocated to it for a message	component in the remote unit that monitors a compression buffer for fields exceeding a preset parameter limit stored in the initialization parameter table, senses whether an application sending a message requires more than its one subframe time slot, and activates the reservation request bit in its time slot to request use of time slots assigned to subsequent remote units for the remainder of the message
D: 2, 11	reservation request generator	A device or process that adds to a message a request for additional time slots.	This phrase, standing alone, is inappropriate for construction. The relevant phrase for construction within the context of the claim language is set forth in the row above.

Group K: "reservation request bit" & related terms

'819 Group K Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
D: 2, 11	reservation request bit	Rembrandt does not believe this term requires construction. In the alternative: at least one bit in a message in order to indicate to the master unit [see '819 Group A] that the remote unit [see '819 Group B] wants additional time to be	bit contained in each time slot in which a remote unit may transmit that allows the remote unit to request temporary use of preassigned time slots of subsequent remote units

U.S. Patent 4,937,819 ("'819 Patent") Claim Construction

'819 Group K Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
		allocated to it for a message.	

Group L: "reservation request processor communicating to said master network timing means, said reservation request processor being responsive to said reservation request bit" & related terms

'819 Group L Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
D: 2, 11	reservation request processor communicating to said master network timing means, said reservation request processor being responsive to said reservation request bit	Rembrandt does not believe this term requires construction. In the alternative: a reservation request processor communicating with the master network timing means [see '819 Group G] to process requests from remote units for additional time slots communicated from the remote units to the reservation request processor using reservation request bits.	a processor communicating to said master network timing means to allow a remote unit to request temporary use of preassigned time slots of subsequent remote units for transmitting messages that are longer than a single slot
D: 2, 11	reservation request processor	A device or process for receiving and processing requests for additional time slots from a reservation request generator.	This phrase, standing alone, is inappropriate for construction. The relevant phrase for construction within the context of the claim language is set forth in the row above.

U.S. Patent 4,937,819 ("'819 Patent") Claim Construction

Group M: "said time slot comprises a format so as to include a preamble, a poll response data bit, said reservation request bits, at least one priority bit and error detection bit" & related terms

'819 Group M Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
D: 11	said time slot comprises a format so as to include a preamble, a poll response data bit, said reservation request bits, at least one priority bit and error detection bit	Rembrandt does not believe this term requires construction. In the alternative: the time slot is formatted to include a preamble, a poll response data bit, reservation bits, at least one priority bit [see '819 Group N] and error detection bit.	the single time slot to which each application is assigned is formatted to include a preamble, a poll response data bit, said reservation request bits, at least one priority bit and error detection bit

Group N: "priority bit" & related terms

'819 Group N Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
D: 11	priority bit	A bit used to convey the relative importance of the communication.	a bit defining a remote unit's relative importance as compared to subsequent units, set by the user at initialization of the master unit

U.S. Patent 4,937,819 ("'819 Patent") Claim Construction

Group O: "transmitting from said master unit to each of said respective remote units the transmission time between said master unit and said respective remote unit, each of said respective remote units using said transmission time to adjust initiation of said slots" & related terms

'819 Group O Claim Element(s)	Element	Rembrandt's Construction	Cable Parties' Construction
I: 14(d)	transmitting from said master unit to each of said respective remote units the transmission time between said master unit and said respective remote unit, each of said respective remote units using said transmission time to adjust initiation of said slots	Rembrandt does not believe this term requires construction. In the alternative: the master unit [see '819 Group A] sends each remote unit [see '819 Group B], the transmission time between the master unit [see '819 Group A] and each respective remote unit, and each remote unit uses its transmission time (from the master unit [see '819 Group A] to that remote unit [see '819 Group B]) to adjust when that remote unit initiates transmission.	during initialization of the master unit before the remote units transmit data, the master unit transmits to each remote unit the transmission time between the master unit and remote unit for each combination of remote unit and application

U.S. Patent 5,719,858 ("'858 Patent") Claim Construction

Group A: "data communications apparatus" & related terms

'858 Group A Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(a), 15(a)	data communications apparatus	Rembrandt does not believe this term requires construction. In the alternative: a data communication device	network access unit (a single device that manages the flow of data between a local network and a network facility)
I: 7(a), 9(a), 11(a) D: 8, 10	communications apparatus		
I: 20(a) D: 26	data communications equipment		

Group B: "bus" & related terms

'858 Group B Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 7(b), 9(b), 11(b), 15(a) 20(a) D: 8, 10, 26	bus	Rembrandt does not believe this term requires construction. In the alternative: one or more conductors that are used as a path for transmitting information from any of several sources to any of several destinations	hardware line(s) within a device used for data transfer among its components

U.S. Patent 5,719,858 ("'858 Patent") Claim Construction

Group C: "time division multiplexed bus" & related terms

'858 Group C Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 7(b), 9(b), 11(b), 15(a), 20(a) D: 8, 10, 26	time division multiplexed bus	a bus having a bandwidth partitioned into a defined, repeated sequence of time slots, that is shared by two or more sources of data by limiting each source's transmission opportunities to discrete intervals of time.	a bus having its bandwidth partitioned into a repeating sequence of time slots defined to be used in the same way during each repetition, whereby only one data source can successfully transmit over the bus at any one discrete interval of time

Group D: "portion" & related terms

'858 Group D Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 7(c), 9(c), 11(c), 15(c), 20(b) D: 8, 10, 26	portion	Rembrandt does not believe this term requires construction. In the alternative: a part of a whole	fixed amount less than the whole

U.S. Patent 5,719,858 ("'858 Patent") Claim Construction

Group E: "portion of the bandwidth is allotted to packet data" & related terms

'858 Group E Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b)	portion of the bandwidth is allotted to packet data	Rembrandt does not believe this term requires construction. In the alternative: one or more time slots allotted to sources of packet data	portion of the TDM data transfer capacity, fixed at initialization, in which all packet data from the plurality of packet data sources that share it must travel, and in which only such packet data may travel
I: 7(d), 9(d), 11(d) D: 8, 10	a second portion of the predefined bandwidth	Rembrandt does not believe this term requires construction. In the alternative: for transmitting packet data in a second portion of the predefined bandwidth [defined below]	
I: 15(c)	allocating a portion of the bandwidth of the time division multiplexed bus to the plurality of packet data sources	Rembrandt does not believe this term requires construction. In the alternative: allocating one or more time slots of the bandwidth of the time-division multiplexed bus [see '858 Group C] to the plurality of packet data [see '858 Group F] sources.	
I: 15(d)	the allocated portion of the bandwidth	Rembrandt does not believe this term requires construction. In the alternative: the allocated time slot[s] of the bandwidth.	
I: 20(b) D: 26	allocating a portion of the bandwidth of the time-division multiplexed bus	Rembrandt does not believe this term requires construction. In the alternative: allocating one or more time slots of the bandwidth of the time-division multiplexed bus [see '858 Group C].	

U.S. Patent 5,719,858 ("'858 Patent") Claim Construction

'858 Group E Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 15(c), 20(b) D: 26	portion of the bandwidth	one or more time slots of the bandwidth.	This phrase, standing alone, is inappropriate for construction. The relevant phrase for construction within the context of the claim language is set forth in the row above and '858 Group D.
I: 7(c), 9(c), 11(c) D: 8, 10	portion of the predefined bandwidth	one or more time slots of the predefined bandwidth.	This phrase, standing alone, is inappropriate for construction. The relevant phrase for construction within the context of the claim language is set forth in the row above and '858 Group D.

U.S. Patent 5,719,858 ("'858 Patent") Claim Construction

Group F: "packet data" & related terms

'858 Group F Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 7(d), 9(d), 11(d), 15(a), 20(a) D: 8, 10, 26	packet data	variable bit rate data	data that travels in packets

Group G: "having a predefined bandwidth" & related terms

'858 Group G Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 7(b), 9(b), 11(b) D: 8, 10	having a predefined bandwidth	Rembrandt does not believe this term requires construction. In the alternative: In the alternative: having a predefined bandwidth [defined below]	first and second portions of the TDM bandwidth fixed during initialization
I: 7(c), 9(c), 11(c) D: 8, 10	predefined bandwidth	a predefined amount of data that can be carried in a unit of time.	This phrase, standing alone, is inappropriate for construction. The relevant phrase for construction within the context of the claim language is set forth in the row above.

U.S. Patent 5,719,858 ("'858 Patent") Claim Construction

Group H: "a first portion of the predefined bandwidth" & related terms

'858 Group H Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 7(c), 9(c), 11(c) D: 8, 10	for communicating synchronous data in a first portion of the predefined bandwidth	Rembrandt does not believe this term requires construction. In the alternative: for transmitting synchronous data in a first part of the predefined bandwidth [see '858 Group E]	portion of the TDM data transfer capacity, fixed at initialization, in which all synchronous data from the plurality of synchronous data sources must travel, and in which only such synchronous data may travel
I: 7(c), 9(c), 11(c) D: 8, 10	synchronous data	constant bit rate data	data sent synchronously through TDM without packetization

U.S. Patent 5,719,858 ("'858 Patent") Claim Construction

Group I: "plurality of packet data sources coupled to the time-division multiplexed bus" & related terms

'858 Group I Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(c), 7(d), 9(d), 11(d) D: 8, 10	plurality of packet data sources coupled to the time-division multiplexed bus	Rembrandt does not believe this term requires construction. In the alternative: more than one source of packet data that are operatively connected to the time-division-multiplexed bus	circuit boards inside the apparatus that each has its own interface connected to the TDM bus that sends only packet data
I: 15(b), 20(c) D: 26	coupling a plurality of packet data sources to the time division multiplexed bus	Rembrandt does not believe this term requires construction. In the alternative: operatively connecting each of a number of sources of packet data to the time-division multiplexed bus [see '858 Group C]	

Group J: "a plurality of synchronous data sources coupled to the time-division multiplexed bus" & related terms

'858 Group J Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 7(c), 9(c), 11(c) D: 8, 10	a plurality of synchronous data sources coupled to the time-division multiplexed bus	Rembrandt does not believe this term requires construction. In the alternative: more than one source of synchronous data that are operatively connected to the time-division-multiplexed bus [see '858 Group C]	circuit boards inside the apparatus that each has its own interface connected to the TDM bus that sends only synchronous data

U.S. Patent 5,719,858 ("'858 Patent") Claim Construction

Group K: "plurality of packet data sources . . . that share the allotted bandwidth for transmitting packet data" & related terms

'858 Group K Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(c)	plurality of packet data sources . . . that share the allotted bandwidth for transmitting packet data	Rembrandt does not believe this term requires construction. In the alternative: more than one source of packet data that each use time slots that are allotted to packet data	without the need for a central packet manager, each packet data source treats the allotted bandwidth as a single channel by contending for use of the entire channel in which no time slot is assigned to any particular packet data source
I: 7(e), 9(d), 11(d) D: 8, 10	where the plurality of packet data sources share the second portion of the predefined bandwidth for transmitting packet data	Rembrandt does not believe this term requires construction. In the alternative: where more than one source of packet data may use the second portion of predefined bandwidth [see '858 Group E] to transmit packet data [see '858 Group F]	without the need for a central packet manager, each packet data source treats the second portion of the predefined bandwidth as a single channel by contending for use of the entire channel in which no time slot is assigned to any particular packet data source
I: 15(c)	in such a way that the allocated portion is shared among the plurality of packet data sources	Rembrandt does not believe this term requires construction. In the alternative: in a manner so that only one source of packet data [see '858 Group F] should use any particular allotted time slot at any time	without the need for a central packet manager, each packet data source treats the allocated portion as a single channel by contending for the entire channel in which no time slot is assigned to any particular packet data source
I: 20(b) D: 26	allocating a portion of the bandwidth of the time division multiplexed bus as a multiple-access packet channel	Rembrandt does not believe this term requires construction. In the alternative: allocating a portion of the bandwidth [see '858 Group E] to be accessed and shared by multiple sources of packet data	

U.S. Patent 5,719,858 ("'858 Patent") Claim Construction

Group L: "distributed packet manager" & related terms

'858 Group L Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(d), 7(f), 15(e), 20(d) D: 8, 10, 26	distributed packet manager	A device, process or algorithm located within each packet data source, that controls how the packet data source accesses the time-division multiplexed bus.	component within each packet data source that permits it to share the allotted bandwidth, without the need for a centralized packet manager, by communicating with other packet data sources to control which one of the plurality of packet data sources can attempt to access the allotted bandwidth at any one time
I: 11(d) D: 10	wherein each one of the plurality of packet data sources includes interface circuitry to the time division multiplexed bus for synchronizing packet data to the time division multiplexed bus	Rembrandt does not believe this term requires construction. In the alternative: each of the multiple sources of packet data [see '858 Group F] is operatively connected to the time division multiplexed bus [see '858 Group C] using interface circuitry in a manner that allows packet data to be communicated from that source of packet data within an appropriate allotted time slot for that source of packet data.	circuitry within each packet data source that permits them to share the second portion of the predefined bandwidth, without the need for a centralized packet manager, by communicating with other packet data sources to control which one of the plurality of packet data sources can attempt to access the allotted bandwidth at any one time
I: 15(e), 20(d) D: 26	controlling access by said packet data sources to the allocated portion of the bandwidth via a distributed packet manager within each of said packet data	Rembrandt does not believe this term requires construction. In the alternative: each source of packet data using a distributed packet manager [defined above] within that source of packet data to control that source's access to an allocated portion of the bandwidth [see '858 Group E].	using a component within each packet data source that permits them to share the allocated portion of the bandwidth, without the need for a centralized packet manager, by communicating with other packet data sources to control which one of the plurality of packet data sources can attempt to access the allotted bandwidth at a time

U.S. Patent 5,719,858 ("'858 Patent") Claim Construction

'858 Group L Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
	sources		
I: 1(d)	allocate access to the allotted bandwidth among said packet data sources	Control access by each of the packet data [see '858 Group F] sources to a portion of the bandwidth previously assigned to packet data [see '858 Group F].	This language is the function of the "distributed packet manager." *See* claim 1(d) element in top row. This phrase, standing alone, is inappropriate for construction. The relevant phrase for construction within the context of the claim language is set forth in the top row above.
I: 7(f) D: 8, 10	allocate access to the second portion of the predefined bandwidth among said packet data sources	Control access by each of the packet data [see '858 Group F] sources to a portion of the predefined bandwidth [see '858 Group G].	This language is the function of the "distributed packet manager." *See* claim 1(d) element in top row. This phrase, standing alone, is inappropriate for construction. The relevant phrase for construction within the context of the claim language is set forth in the top row above.
I: 15(e), 20(d) D: 26	controlling [the] access by said packet data sources to the allocated portion of the bandwidth	Controlling access by each of the packet data [see '858 Group F] sources to the allocated portion of the bandwidth [see '858 Group E].	This language is the function of the "distributed packet manager." *See* claim 1(d) element in top row. This phrase, standing alone, is inappropriate for construction. The relevant phrase for construction within the context of the claim language is set forth in the top row above.

U.S. Patent 5,719,858 ("'858 Patent") Claim Construction

Group M: "the second portion of the predefined bandwidth being shared in such a way that only one of the plurality of packet data sources accesses the second portion of the predefined bandwidth at a time" & related terms

'858 Group M Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 9(d)	the second portion of the predefined bandwidth being shared in such a way that only one of the plurality of packet data sources accesses the second portion of the predefined bandwidth at a time	Rembrandt does not believe this term requires construction. In the alternative: the second portion of the predefined bandwidth [see '858 Group E] is used by the sources of packet data so that only one source of packet data should use any particular allotted time slot at a time.	sharing where only one packet data source can attempt to access the predefined second portion at a time

U.S. Patent 5,719,858 ("'858 Patent") Claim Construction

Group N: "transmitting packet data from the one of the plurality of packet data sources having access to the multiple-access packet channel" & related terms

'858 Group N Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 20(e) D: 26	transmitting packet data from the one of the plurality of packet data sources having access to the multiple-access packet channel	Rembrandt does not believe this term requires construction. In the alternative: transmitting packet data [see '858 Group F] from one of the multiple sources of packet data [see '858 Group F] sources having access to the shared packet channel.	transmitting packet data from the only one of the plurality of packet data sources that was allowed by the distributed packet manager to have access to the multiple-access packet channel

U.S. Patent 5,719,858 ("'858 Patent") Claim Construction

Group O: "network access manager" & related terms

'858 Group O Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
D: 8, 26	network access manager	A device, process or algorithm for controlling the assignment of synchronous and packet data portions on a time division multiplexed bus [see '858 Group C], and for passing data between the bus and a network.	component of the network access unit that provides the interface between the TDM bus in the network access unit and at least one network facility

Group P: "a counter for counting time slots representing the second portion of the predefined bandwidth" & related terms

'858 Group P Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 11(d)	a counter for counting time slots representing the second portion of the predefined bandwidth	Rembrandt does not believe this term requires construction. In the alternative: a device that measures time slots in the second portion of the predefined bandwidth [see '858 Group E].	a counter that counts only the time slots in the second portion of the predefined bandwidth

U.S. Patent 6,950,444 ("'444 Patent")

Group A: "preamble operating to frame the message and to delimit the message from silence" & related terms

'444 Group A Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 12(b), 23(b), 34(b) D: 24, 35	the preamble operating to frame the message and to delimit the message from silence	Rembrandt does not believe this term requires construction. In the alternative: an initial pattern of bits to frame the message and to delimit the message from silence	the preamble includes a first symbol transmitted at a power level higher than all other preamble symbols to precisely identify the beginning of the message and communication link control information used to precisely identify the end of the message

Group B: "a plurality of bits representing communication link control information" & related terms

'444 Group B Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 12(b), 23(b), 34(b) D: 24, 35	a plurality of bits representing communication link control information	Rembrandt does not believe this term requires construction. In the alternative: multiple bits used to convey communication link control information.	transmit rate bits, maximum receive rate bits, address bits (where there is more than one remote), and message format bits, decoded by the receiver to control communications over the link
I: 23(b) D: 24	means for applying a preamble to a communication message…the preamble including a plurality of bits representing	Means plus function claim language to be construed pursuant to 112, ¶ 6. Means plus function term: "means for applying a preamble to a communication message". Function: Applying a preamble to a	Means plus function element to be construed pursuant to 112, ¶ 6. Function – applying a preamble to a communication message, the preamble operating to frame the message and delimit the message from silence, the preamble including a

U.S. Patent 6,950,444 ("'444 Patent")

'444 Group B Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
	communication link control information	communication message. Structure: A sequencer and multiplexer, or the equivalents. FIG. 8 (elements 224 and 236).	plurality of bits representing communication link control information -- *see* above row and '444 Group A for construction of the imitations of this function Structure – includes transmit sequencer **236**, message format **201**, the remote address **202**, the receiving rate **204** and the transmission rate **205**, along with the multiplexer **214**. **201-202** and **204, 206** are computer readable memory that separately store bits representing the communication link control information (*see* above row) and separately supply those bits to the multiplexer **214** when commanded to do so by the multiplexer
1(b), 12(b), 23(b), 24 34(b), 35	communication link control information	A programmable pattern of bits to convey information regarding the communication.	This phrase, standing alone, is inappropriate for construction. The relevant phrase for construction within the context of the claim language is set forth in the top row above.

U.S. Patent 6,950,444 ("'444 Patent")

Group C: "an encoder configured to encode the preamble bits into a plurality of symbol indices, the symbol indices encoded at a lower bit per symbol rate relative to the maximum rate capable of being supported over a communication channel" & related terms

'444 Group C Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(c)	an encoder configured to encode the preamble bits into a plurality of symbol indices, the symbol indices encoded at a lower bit per symbol rate relative to the maximum rate capable of being supported over a communication channel	Rembrandt does not believe this term requires construction. In the alternative: a mechanism adapted to convert preamble bits into multiple symbols, where the symbols are encoded using a lower bit to symbol rate than the maximum rate capable of being supported over a communication channel.	an encoder converts the preamble bits into symbols at a lower bit per symbol rate than the maximum receive rate specified in the preamble that was just received
I: 12(c), 34(c) D: 35	encoding the preamble bits into a plurality of symbol indices, the symbol indices encoded at a lower bit per symbol	Rembrandt does not believe this term requires construction. In the alternative: converting the preamble bits into multiple symbols, where the symbols are encoded using a bit-to-symbol rate that is less than the maximum rate capable of being transmitted over a communication	

U.S. Patent 6,950,444 ("'444 Patent")

'444 Group C Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
	rate relative to the maximum rate capable of being transmitted over a communication channel	channel.	
I: 12(c), 34(c) D: 35	the symbol indices encoded at a lower bit per symbol rate relative to the maximum rate capable of being transmitted over a communication channel	Rembrandt does not believe this term requires construction. In the alternative: converting the preamble bits into multiple symbols, where the symbols are encoded using a bit-to-symbol rate that is less than the maximum rate capable of being transmitted over a communication channel [defined above].	
I: 23(c) D: 24	means for encoding the preamble bits into a plurality of symbol indices, the symbol indices encoded at a lower bit per symbol rate relative to the maximum rate capable of being transmitted over a communication channel	Means plus function claim language to be construed pursuant to 112, ¶ 6. Means plus function term: "means for encoding the preamble bits into a plurality of symbol indices". Function: Encoding the preamble bits into a plurality of symbol indices. Structure: A Preamble Encoder, or the equivalents. FIG. 8 (element 219)	Means plus function element to be construed pursuant to 112, ¶ 6. Function – encoding the preamble bits into a plurality of symbol indices, the symbol indices encoded at a lower bit per symbol rate relative to the maximum rate capable of being transmitted over a communication channel -- *see* row above for construction of the limitations of this function Structure – **219**, the 2 bit per symbol preamble encoder

U.S. Patent 6,950,444 ("'444 Patent")

'444 Group C Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(c), 12(c), 23(c), 34(c) D: 24, 35	maximum rate capable of being transmitted over a communication channel/ maximum rate capable of being supported over a communication channel	The highest bit per symbol rate at which the data portion of the message is sent.	This phrase, standing alone, is inappropriate for construction. The relevant phrase for construction within the context of the claim language is set forth in the top row above.

U.S. Patent 5,008,903 ("'903 Patent") Claim Construction

Group A: "noise spectrum"

'903 Group A Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(d), 6(d), 8(d), 21(e) D: 2-5, 7, 15-20	noise spectrum	Rembrandt does not believe this term requires construction. In the alternative: noise signal values.	frequency domain plot of the noise signals across a range of frequencies

U.S. Patent 5,008,903 ("'903 Patent") Claim Construction

Group B: "generating means for generating parameters responsive to a noise spectrum of said output"

'903 Group B Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(d), 8(d) D: 2-5, 15-20	generating means for generating parameters responsive to a noise spectrum of said output	Means plus function claim language to be construed pursuant to 112, ¶ 6. Means plus function term: "generating means for generating parameters responsive to a noise spectrum of said output" Function: Generating parameters responsive to a noise spectrum of the output signal. Structure: A discrete Fourier transform circuit, or the equivalents. (FIG. 4 (68); Col. 3: 41-45; Col. 4: 55-56).	Means plus function element to be construed pursuant to 112, ¶ 6. Function – generating parameters by choosing points of a noise spectrum of said output Structure – noise spectrum generator circuit **50**, including complex DFT block **68** that calculates a frequency domain plot of the noise signal at 709, 1145, 1800, 2455 and 2891 Hertz chosen from a 22 point discrete Fourier transform
I: 6(d) D: 7	generating means, including a noise spectrum generator circuit, for generating parameters responsive to a noise spectrum of said output	Means plus function claim language to be construed pursuant to 112, ¶ 6. Means plus function term: "generating means for generating parameters responsive to a noise spectrum of said output" Function: Generating parameters responsive to a noise spectrum of the output signal. Structure: Noise spectrum generator circuitry, or the equivalents. (Fig. 4, (element 50); FIG. 5 (element 24).)	

U.S. Patent 5,008,903 ("'903 Patent") Claim Construction

'903 Group B Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(e), 6(e), 8(e), 21(g) D: 2-5, 7, 15-20	said parameters	Rembrandt does not believe this term requires construction. In the alternative: values based upon the noise spectrum [see '903 Group A].	generated parameters chosen as points of a noise spectrum of said output
I: 21(f)	generating parameters responsive to said noise spectrum of said output	Rembrandt does not believe this term requires construction. In the alternative: generating values based upon the noise spectrum [see '903 Group A] of the signal received from the transmitting modem.	generating parameters by choosing points of a noise spectrum of said output
I: 1(d), 6(d), 8(d), 21(f) D: 2-5, 7, 15-20	parameters responsive to a noise spectrum/ parameters responsive to said noise spectrum	values based upon the noise signal at given frequencies	This phrase, standing alone, is inappropriate for construction. The relevant phrase for construction within the context of the claim language is set forth in the rows above. In the alternative: generated parameters chosen as points of a noise spectrum of said output

U.S. Patent 5,008,903 ("'903 Patent") Claim Construction

Group C: ". . . adjusting frequency dependent characteristics . . ." & related terms

'903 Group C Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 6(b), 8(b), 21(c) D: 2-5, 7, 15-20	. . . adjusting frequency-dependent characteristics . . .	Rembrandt does not believe this term requires construction. In the alternative: adjusting the frequency dependent characteristics.	adjusting the signal using preemphasis coefficients computed from the noise spectrum parameters, so that the signal to be input into the receiving modem has a constant signal to noise ratio across all frequencies whether the noise is injected before or after the high frequency roll-off of a communications line

Group D: "first transmitting means in the transmitting modem, including adjusting means responsive to the pre-emphasis coefficients for adjusting frequency dependent characteristics of an output of said first transmitting means" & related terms

'903 Group D Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 6(b), 8(b) D: 2-5, 7, 15-20	first transmitting means in the transmitting modem, including adjusting means responsive to the pre-emphasis coefficients for adjusting frequency dependent characteristics of an output of said first	Rembrandt does not believe this term requires construction. In the alternative: first transmitting means in the transmitting modem – a transmitter in the transmitting modem. including adjusting means responsive to the pre-emphasis coefficients for adjusting frequency dependent characteristics of an output of said first transmitting means – means plus function claim language to be construed pursuant to 112,	Means plus function element to be construed pursuant to 112, ¶ 6. Function – adjusting frequency dependent characteristics of an output of said first transmitting means Structure – conventional modem transmitter **14**, with nine-tap filter **70** comprising delay blocks **71-79**, multipliers **81-89**, and adder **90**

U.S. Patent 5,008,903 ("'903 Patent") Claim Construction

'903 Group D Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
	transmitting means	¶ 6 Means plus function term: "adjusting means". Function: Adjusting the frequency dependent characteristics of the output signal based upon the pre-emphasis coefficients. Structure: A pre-filter, or the equivalents. (Fig. 5 (element 16).)	

U.S. Patent 5,008,903 ("'903 Patent") Claim Construction

Group E: "receiving means for receiving said output from said first transmitting means" & related terms

'903 Group E Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(c), 6(c), 8(c) D: 2-5, 7, 15-20	receiving means for receiving said output from said first transmitting means	Means plus function claim language to be construed pursuant to 112, ¶ 6. Means plus function term: "receiving means" Function: Receiving output from the transmitting means. Structure: A receiver, or the equivalents. (Fig. 5 (element "RX", between elements 22 and 24))	Means plus function element to be construed pursuant to 112, ¶ 6. Function – receiving said output from said first transmitting means Structure – Fig. 4, element "RX"

U.S. Patent 5,008,903 ("'903 Patent") Claim Construction

Group F: "noise spectrum generator circuit" & related terms

'903 Group F Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(d) D: 2-5, 15-20	means for calculating said noise spectrum of said output	Means plus function claim language to be construed pursuant to 112, ¶ 6. Means plus function term: "means for calculating said noise spectrum of said output". Function: Calculating said noise spectrum of said output. Structure: Noise spectrum generator circuitry, or the equivalents. (Fig. 4, (element 50); FIG. 5 (element 24).)	Means plus function element to be construed pursuant to 112, ¶ 6. Function – calculating noise signals of said output in the time domain and converting them into a spectrum in the frequency domain Structure – noise spectrum generator circuit **50**, including equalizers **56** & **57**, phase corrector **60**, slicer **62**, comparator **64**, inverse phase corrector **66** and block **68** that performs a 22 point discrete Fourier transformation calculation
I: 6(g), 8(g) D: 7	noise spectrum generator circuit	Rembrandt does not believe this term requires construction. In the alternative: circuitry that generates a noise spectrum [see '903 Group A]	circuit which calculates noise signals in the time domain (successive values corresponding to successive frequencies) and converts them into a spectrum in the frequency domain and generates parameters by choosing points of the noise spectrum
I: 21(e)	calculating a noise spectrum of said output	Rembrandt does not believe this term requires construction. In the alternative: calculating a noise spectrum [see '903 Group A] of the signal received from the transmitting modem.	calculating noise signals of said output in the time domain and converting them into a spectrum in the frequency domain

U.S. Patent 5,008,903 ("'903 Patent") Claim Construction

Group G: "second transmitting means for transmitting said parameters to the transmitting modem" & related terms

'903 Group G Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(e), 6(e), 8(e) D: 2-5, 7, 15-20	second transmitting means for transmitting said parameters to the transmitting modem	Means plus function claim language to be construed pursuant to 112, ¶ 6. Means plus function term: "second transmitting means". Function: Transmitting said parameters to the transmitting modem. Structure: A second transmitter, or the equivalents. (Fig. 5 (element 38).)	Means plus function element to be construed pursuant to 112, ¶ 6. Function – transmitting said parameters to the transmitting modem Structure – low rate secondary channel transmitter **38** that transmits on a sideband of the primary channel at a low transmission rate through line **42** via digital-to-analog converter **40**
D: 15, 16	secondary channel	a second communication path provided by a transmission medium via either physical or electrical separation from a first communication path	sideband of the primary channel

U.S. Patent 5,008,903 ("'903 Patent") Claim Construction

Group H: "computing means for computing the pre-emphasis coefficients from said parameters" & related terms

'903 Group H Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(f), 6(f), 8(f) D: 2-5, 7, 15-20	computing means for computing the pre-emphasis coefficients from said parameters	Means plus function claim language to be construed pursuant to 112, ¶ 6. Means plus function term: "computing means". Function: Computing the pre-emphasis coefficients from the parameters. Structure: compute/computer block 48 and operating code which performs the steps of computing the pre-emphasis coefficients from the parameters, or the equivalents. (Fig. 4 (element 48); Col. 4: 66, Col. 5: 17.)	Means plus function element to be construed pursuant to 112, ¶ 6. Function – computing at the transmitting modem pre-emphasis coefficients from said parameters Structure – transmitting modem circuitry containing comparator **28** that subtracts the previous frequency domain plot of the noise signal (previous parameters) stored in shift register **26** from the current plot (current parameters), multiplier **30** that divides the output of the comparator, compute block **48** implementing the log to linear algorithm at Col. 4:66 and the algorithms set forth at Col. 5:1-17; and including AGC circuit

U.S. Patent 5,008,903 ("'903 Patent") Claim Construction

Group I: "output from said transmitting step" & related terms

'903 Group I Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 21(c)	output from said transmitting step	Rembrandt does not believe this term requires construction. In the alternative: output signal from the transmitting modem	output of modem transmitter to be adjusted responsive to the pre-emphasis coefficients
I: 21(d)	receiving said output from said first transmitting means	Rembrandt does not believe this term requires construction. In the alternative: receiving the output signal sent from the transmitting modem.	remote modem receives "said output from said transmitting step" as construed in the row above

U.S. Patent 6,131,159 ("'159 Patent") Claim Construction

Group A: "a set of programs stored in said memory that are executed when the system needs to be initialized" & related terms

'159 Group A Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 6(b) D: 2-5, 7	a set of programs stored in said memory that are executed when the system needs to be initialized	Rembrandt does not believe this term requires construction. In the alternative: the set of programs used by the system to initialize it.	the set of programs used by the system to initialize it, including the boot up program for the apparatus and programs needed to maintain communications between the apparatus and a remote processor, that are stored in and executed from nonvolatile memory when the system is powered on or re-booted
I: 10(c) D: 11-17	said memory containing programs, including a set of programs that are executed when the system needs to be initialized and a program for controlling communication through said communication port	Rembrandt does not believe this term requires construction. In the alternative: a program that, when executed, provides communication with remote devices via the communication port.	
I: 8(c) D: 9	a program module in said memory that, when activated by said processor, effects communication with said port	Rembrandt does not believe this term requires construction. In the alternative: a set of instructions that, when executed by the processor, provides communication with remote devices via the communication port.	the set of programs that upon execution by the processor from the system's non-volatile memory, enable the system to boot-up and communicate with a remote processor through the communications port

U.S. Patent 6,131,159 ("'159 Patent") Claim Construction

'159 Group A Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 18(c) D: 19-21	set of program means stored in said memory that are activated when said system needs to be updated with a new set of programs	Rembrandt does not believe this term requires construction. In the alternative: set of programs stored in the memory that, when executed, support updating the system with a new set of programs	set of programs used by the system to initialize it, including the boot up program for the apparatus, programs needed to maintain communications between the apparatus and a remote processor, and subroutines for updating the system's programs, that are stored in and executed from nonvolatile memory when the system is powered on or re-booted

U.S. Patent 6,131,159 ("'159 Patent") Claim Construction

Group B: "said memory being the only program memory in said system" & related terms

'159 Group B Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 6(b) D: 2-5, 7	said memory being the only program memory in said [the] system	Rembrandt does not believe this term requires construction. In the alternative: the only memory used by the system for non-volatile storage of initialization programs.	the system's completely updateable nonvolatile memory is the only memory from which the system executes programs
I: 1(b), 6(b) D: 2-5, 7	program memory	Updateable and non-volatile memory where initialization programs are stored.	This phrase, standing alone, is inappropriate for construction. The relevant phrase for construction within the context of the claim language is set forth in the above row.

Group C: "non-volatile" & related terms

'159 Group C Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 6(b), 8(b), 10(c), 18(b) D: 2-5, 7, 11-17, 19-21	memory…not volatile memory…non-volatile	AGREED: memory that retains its contents when power to the memory is disconnected	AGREED: memory that retains its contents when power to the memory is disconnected

U.S. Patent 6,131,159 ("'159 Patent") Claim Construction

Group D: "said memory being of a type which may be completely updated in its entirety but which is not volatile" & related terms

'159 Group D Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b) D: 2-5	said memory being of a type which may be completely updated in its entirety but which is not volatile	Rembrandt does not believe this term requires construction. In the alternative: nonvolatile memory which may be overwritten	the system enables all contents in the system's non-volatile memory to be erased and overwritten during an update operation
I: 6(b), 8(b) D: 7, 9	said memory being completely updatable in its entirety but non-volatile		
I: 10(c) D: 11-17	said memory being non-volatile and capable of being completely updated in its entirety		
I: 18(b) D: 19-21	said memory being of a type, which is completely updatable in its entirety but non-volatile		

U.S. Patent 6,131,159 ("'159 Patent") Claim Construction

Group E: "alterable storage means for holding a displacement multi-bit memory address that is used to point to the starting address accessed by the processor when initializing" & related terms

'159 Group E Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(c) D: 2-5	alterable storage means for holding a displacement multi-bit memory address that is used to point to the starting address accessed by the processor when initializing	Means plus function claim language to be construed pursuant to 112, ¶ 6. Means plus function term: "alterable storage means for holding a displacement multi-bit memory address". Function: holding a displacement multi-bit memory address. Structure: register 40 (col. 2, line 59, col. 4, lines 37-48).	Means plus function element to be construed pursuant to 112, ¶ 6. Function – storing an updateable multiple bit address that is added to a memory address supplied by the processor that changes the first nonvolatile memory location accessed by the processor when the system is powered on or re-booted Structure – updateable offset address register **40** connected to and separate from processor **10** and modifier circuit **30**
I: 6(c) D: 7	alterable memory means for storing a multi-bit memory address that controls the starting address accessed by the processor when initializing	Means plus function claim language to be construed pursuant to 112, ¶ 6. Means plus function term: "alterable memory means for storing a multi-bit memory address". Function: storing a multi-bit memory address. Structure: register 40 (col. 2, line 59, col. 4, lines 37-48).	
I: 18(d) D: 19-21	alterable storage means for holding an offset memory	Means plus function claim language to be construed pursuant to 112, ¶ 6.	Means plus function element to be construed pursuant to 112, ¶ 6.

U.S. Patent 6,131,159 ("'159 Patent") Claim Construction

'159 Group E Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
	address that is used to point to a starting address accessed by said processor when initializing	Means plus function term: alterable storage means for holding an offset memory address. Function: holding an offset memory address. Structure: Register 40. (col. 2, line 59, col. 4, lines 37-48).	Function – storing an updateable multiple bit address that is added to a memory address supplied by the processor that changes the first memory location accessed by the processor when the system is powered on or rebooted Structure – updateable offset address register **40** connected to and separate from processor **10** and modifier circuit **30**

U.S. Patent 6,131,159 ("'159 Patent") Claim Construction

Group F: "means for receiving a trigger signal at a telecommunications input port of the system to begin execution of said programs" & related terms

'159 Group F Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
D: 7	means for receiving a trigger signal at a telecommunications input port of the system to begin execution of said programs	Means plus function claim language to be construed pursuant to 112, ¶ 6. Means plus function term: "means for receiving a trigger signal" Function: Receiving a trigger signal. Structure: Processor 10 programmed to perform the step of monitoring data supplied to the telecommunications port. (Figs. 1 and 2, Col. 3 lines 1-4, 52-56).	Means plus function element to be construed pursuant to 112, ¶ 6. Function – receiving from a port that communicates with a remote processor a signal to begin executing from the non-volatile memory the set of programs that needs to be executed when the system is powered on or rebooted Structure[2] – processor **10** with port coupled to external communications line **12**, buses **13**, **14**, and **16**, register **40**, modifier circuit **30**, nonvolatile memory **20** containing EP set of programs, and an algorithm implementing steps in Figure 2 or 3 out of nonvolatile memory **20**

[2] By way of example and without limitation, Cable Parties note that regarding claims 7, 8(d), and 10(d), there is no structure clearly linked to the claimed function, rendering the claims invalid. Cable Parties have set forth the only potentially corresponding structure.s

U.S. Patent 6,131,159 ("'159 Patent") Claim Construction

Group G: "Operationally alterable means for setting the starting address, which address is supplied to said system via said communication port" & related terms

'159 Group G Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 8(d) D: 9	operationally alterable means for setting the starting address of said program, which address is supplied to said system via said communication port	Means plus function claim language to be construed pursuant to 112, ¶ 6. Means plus function term: "operationally alterable means for setting the starting address" Function: Setting the starting address of program that effects communication with communication port. Structure: register 40 (col. 2, line 59, col. 4, lines 37-48).	Means plus function element to be construed pursuant to 112, ¶ 6. Function – while the program module in said memory is operating, downloading and storing an offset address that is added to a memory address supplied by the processor that changes the first memory location accessed by the processor when the system is powered on or rebooted Structure – processor **10** with port coupled to external communications line **12**, buses **13**, **14**, and **16**, offset address register **40**, modifier circuit **30**, nonvolatile memory **20** containing EP set of programs, and an algorithm for executing either the steps of Figure 2 or 3 out of nonvolatile memory **20**

U.S. Patent 6,131,159 ("'159 Patent") Claim Construction

Group H: "means for activating said program for controlling communication . . . " & related terms

'159 Group H Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 10(d) D: 11-17	means for activating said program for controlling communication	Means plus function claim language to be construed pursuant to 112, ¶ 6. Means plus function term: "means for activating said program for controlling communication". Function: Activating program for controlling communication through communication port. Structure: Communication port and processor 10 programmed to perform the step of activating the program for controlling communication. (Figs. 1 and 2, Col. 3 lines 1-4, 16-19, 52-56).	Means plus function element to be construed pursuant to 112, ¶ 6. Function – activating the program in the nonvolatile memory for controlling communication through said communication port Structure – processor **10** with port coupled to external communications line **12**, buses **13**, **14**, and **16**, offset register **40**, modifier circuit **30**, nonvolatile memory **20** containing an EP set of programs, and an algorithm for executing either the steps of Figure 2 or 3 out of nonvolatile memory **20**

U.S. Patent 6,131,159 ("'159 Patent") Claim Construction

Group I: "means . . . for receiving information through said communication port to modify the programs in said memory, said information including the program for controlling communication through said communication port and a command that is executed by said processor effectively when it is received" & related terms

'159 Group I Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 10(d) D: 11-17	means for . . . receiving information through said communication port to modify the programs in said memory, said information including the program for controlling communication through said communication port and a command that is executed by said processor effectively when it is received	Means plus function claim language to be construed pursuant to 112, ¶ 6. Means plus function term: "means for…receiving information through said communication port". Function: Receiving information through the communication port. Structure: System including memory, communication port, and processor including programmed to perform the step of receiving information through said communication port to modify the programs in said memory. (Figs. 1 and 2, Col. 3 lines 1-4, 16-19, 52-56).	Means plus function element to be construed pursuant to 112, ¶ 6. Function – receiving in nonvolatile memory through the processor's communication port information which modifies the programs in the system's non-volatile memory, including the activated program for controlling communication in the nonvolatile memory, and a command received directly into the processor and executed Structure – processor **10** with port coupled to external communications line **12**, buses **13**, **14**, and **16**, offset register **40**, modifier circuit **30**, nonvolatile memory **20** containing an EP set of programs, and an algorithm for executing either the steps of Figure 2 or 3 out of nonvolatile memory **20**

U.S. Patent 6,131,159 ("'159 Patent") Claim Construction

Group J: "communications port coupled to said processor, said communications port being adapted to communicate with devices which are external to said system" & related terms

'159 Group J Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 8(b), 10(b) D: 9, 11-17	communication[s] port	An interface through which remote communication is supported.	port through which information is downloaded from a remote processor into nonvolatile memory
I: 8(b), 10(b) D: 9, 11-17	communication(s) port coupled to said processor, said communications port being adapted to communicate with devices which are external to said system	Rembrandt does not believe this term requires construction. In the alternative: an interface through which remote communication is supported, is operatively coupled to a processor to communicate with remote devices	communications port connected to the processor so that the processor can receive program data, commands, and other information from remote devices through the port before any such information is stored in any memory

U.S. Patent 5,778,234 ("'234 Patent") Claim Construction

Group A: "memory" "P_{old}", "P_{new}", "EP_{old}" "EP_{new}" & related terms

'234 Group A Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(a), 5(a) D: 2-4, 6-8	memory	Rembrandt does not believe this term requires construction. In the alternative: electronic storage or holding place for data, including instructions	nonvolatile memory
I: 1(a), 5(a) D: 2-4, 6-8	P_{old}	Rembrandt does not believe this term requires construction. In the alternative: set of communication programs already resident in memory	the entire set of programs used by the apparatus, which is stored in and executing from non-volatile memory, when the process to install a new entire set of programs begins
I: 1(a), 5(a) D: 2-4, 6-8	P_{new}	Rembrandt does not believe this term requires construction. In the alternative: a new set of programs to be installed	the new entire set of programs (to replace P_{old}), which is stored in and executed from non-volatile memory after downloading into that memory through the communication port from a remote processor
I: 1(a), 5(a) D: 2-4, 6-8	EP_{old}	Rembrandt does not believe this term requires construction. In the alternative: a susbset of essential programs within P_{old} [defined above] that contains boot-up segments and program segments necessary to maintain communication between the apparatus and a remote device	essential subset of the P_{old} set of programs that includes the boot up program for the apparatus and programs needed to maintain communications between the apparatus and a remote processor
I: 1(a), 5(a) D: 2-4, 6-8	EP_{new}	Rembrandt does not believe this term requires construction. In the alternative: a subset of essential programs within P_{new} [defined above] that contains boot-up segments and program segments necessary to maintain communication between the apparatus and a remote device	essential subset of the P_{new} set of programs that includes the new boot up program and new programs needed to maintain communications between the apparatus and a remote processor

U.S. Patent 5,778,234 ("'234 Patent") Claim Construction

'234 Group A Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(a), 5(a) D: 2-4, 6-8	communication port	programs that support remote communication	port through which P_{new} programs are downloaded from a remote processor into nonvolatile memory

U.S. Patent 5,778,234 ("'234 Patent") Claim Construction

Group B: ". . . with the aid of a set of communications programs P_{old} already resident in said memory" & related terms

'234 Group B Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(a), 5(a) D: 2-4, 6-8	. . . with the aid of a set of communications programs P_{old} already resident in said memory	Rembrandt does not believe this term requires construction. In the alternative: some of the P_{old} programs [see '234 Group A] assist with installing P_{new} programs [see '234 Group A]	the P_{old} programs executing from the nonvolatile memory assist with downloading P_{new} programs for use in the nonvolatile memory
I: 1(a), 5(a) D: 2-4, 6-8	communications programs	an interface through which remote communication is supported.	This phrase, standing alone, is inappropriate for construction. The term communications programs is used in the context of P_{old} and P_{new} set forth in '234 Group A.

U.S. Patent 5,778,234 ("'234 Patent") Claim Construction

Group C: "installing the EP_{new} programs in a first area of said memory . . ." & related terms

'234 Group C Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 5(b) D: 2-4, 6-8	installing the EP_{new} programs in a first area of said memory . . .	Rembrandt does not believe this term requires construction. In the alternative: downloading and storing the EP_{new} programs [see '234 Group A] into an area of memory [see '234 Group A] that does not contain the EP_{old} programs [see '234 Group A].	downloading and storing EP_{new} programs for immediate execution from a first area of said memory

Group D: "said memory" & related terms

'234 Group D Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b)(d), 5(b) D: 2-4, 6-8	said memory	Rembrandt does not believe this term requires construction. In the alternative: a memory of the apparatus.	memory in which P_{old} is stored and executing

U.S. Patent 5,778,234 ("'234 Patent") Claim Construction

Group E: "that contains programs other than the EP_{old} programs, thereby overwriting at least a portion of one program in said P_{old} set of programs" & related terms

'234 Group E Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(b), 5(b) D: 2-4, 6-8	that contains programs other than the EP_{old} programs, thereby overwriting at least a portion of one program in said P_{old} set of programs	Rembrandt does not believe this term requires construction. In the alternative: EP_{new} [see '234 Group A] is installed in an area of memory [see '234 Group A] that does not contain EP_{old} programs [see '234 Group A] and that includes at least a portion of at least one program in the P_{old} set of programs [see '234 Group A].	installing the EP_{new} programs in a first area of said memory that contains programs other than the EP_{old} programs overwrites at least a portion of one program in said P_{old} set of programs

U.S. Patent 5,778,234 ("'234 Patent") Claim Construction

Group F: "altering operation of said apparatus to execute the EP_{new} programs instead of the EP_{old} programs" & related terms

'234 Group F Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(c), 5(c) D: 2-4, 6-8	altering operation of said apparatus to execute the EP_{new} programs instead of the EP_{old} programs	Rembrandt does not believe this term requires construction. In the alternative: causing the apparatus to execute EP_{new} programs [see '234 Group A] instead of EP_{old} programs [see '234 Group A].	the apparatus stops executing the EP_{old} programs and immediately begins executing the EP_{new} programs from nonvolatile memory so that communications can continue seamlessly

Group G: "installing the remaining programs of said P_{new} set of programs" & related terms

'234 Group G Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(d), 5(e) D: 2-4, 6-8	installing the remaining programs of said P_{new} set of programs	Rembrandt does not believe this term requires construction. In the alternative: installing the remaining uninstalled programs of the P_{new} set of programs [see '234 Group A].	the EP_{new} programs are used to install the remaining programs of the P_{new} set of programs

U.S. Patent 5,778,234 ("'234 Patent") Claim Construction

Group H: "remaining programs of said P_{new} set of programs" & related terms

'234 Group H Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 1(d), 5(e) D: 2-4, 6-8	remaining programs of said P_{new} set of programs	Rembrandt does not believe this term requires construction. In the alternative: subset of P_{new} programs [see '234 Group A] that does not include the EP_{new} programs [see '234 Group A].	subset of P_{new} programs remaining to be transmitted that does not include the previously installed EP_{new} programs

Group I: "altering operation of said apparatus to execute said EP_{new} programs is accomplished by installing an offset address to pass control of said apparatus to said EP_{new} programs" & related terms

'234 Group I Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
D: 4, 8	altering operation of said apparatus to execute said EP_{new} programs is accomplished by installing an offset address to pass control of said apparatus to said EP_{new} programs	Rembrandt does not believe this term requires construction. In the alternative: installing an offset address to cause the apparatus to execute the EP_{new} programs [see '234 Group A] instead of the EP_{old} programs [see '234 Group A].	installing an offset address that is added to a memory address supplied by the processor to cause the apparatus to stop executing the EP_{old} programs and immediately begin executing the EP_{new} programs from nonvolatile memory so that communications can continue seamlessly

U.S. Patent 5,778,234 ("'234 Patent") Claim Construction

Group J: "moving the EP_{new} programs from said first area of memory to a second area of said memory" & related terms[3]

'234 Group J Claim Element(s)	Phrase for Construction	Rembrandt's Construction	Cable Parties' Construction
I: 5(d) D: 6-8	moving the EP_{new} programs from said first area of memory to a second area of said memory	Rembrandt does not believe this term requires construction. In the alternative: moving the EP_{new} programs [see '234 Group A] into a second area of the memory [see '234 Group A].	the executing EP_{new} programs move into a second area of the nonvolatile memory

[3] Cable Parties adverse to Rembrandt on the eight patents expressly reserve and do not waive any of their affirmative defenses of patent invalidity, including without limitation Section 112 enablement, written description, and indefiniteness defenses. By providing proposed constructions in the claim construction proceedings, Cable Partiies do not admit that any claim or claim limitation is described, enabled, definite or otherwise valid